The Builder.

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The Temple of Bubastis.

THE annual volume issued by the Egypt Exploration Fund consists this year of a description of the researches made on part of the site of the Temple at Bubastis,* which, having been cleared of the mass of accumulated earth entirely covering it, was explored some few years since, and the results published. At that time it was noticed that a vast number of carved and inscribed stones were lying in one particular spot apart from the Temple proper. These have now been examined, and the results are set forth in the volume before us. One of the plates shows the condition of the fallen remains when cleared of the earth that had covered them for many centuries, and they appear to lie in an almost hopeless mass of confusion, one huge granite block being heaped upon another over the whole area upon which they had fallen. The explorers proceeded to examine each stone separately, many having to be turned over and rolled, after which, paper casts were made of the inscriptions which were found engraved on each. When all had been thus copied an effort was made to put the whole of the subjects together, a work of very great difficulty, increased considerably by the fact that a great many of the blocks were either missing or so thoroughly destroyed that the inscriptions and carvings were obliterated. However, the angles, where they were preserved, served as guides for the arrangement of the subjects, and, judging from the large number of plates, which form a considerable part of the volume,—they are forty in number,—M. Naville has succeeded in reproducing the subjects in a remarkably clear and satisfactory manner.

Much has naturally to be left to conjecture, especially where many of the neighbouring blocks are wanting, but the plates amply show that in the general arrangement of the subjects there is but little in the restoration before us of the positions of the various groups that is likely to be very far wrong.

The sculptures have adorned the fronts and the sides of a wide gateway, which, facing east, formed the entrance from one hall into another, the size of the latter is supposed to have been about 120 ft. by 80 ft. The drawing of the restoration shows this gateway with a sloping front, the head being formed by a horizontal cornice of the usual quarter-round curve springing from a bead. The excavations of the temple began in the hall, which appears from the inscriptions and the subjects to have been rebuilt by Osorkon II., as the festival-hall of the "Sed Festival," about 950 years B.C. The older building is spoken of by our author as having belonged to the Old Empire. It contained a doorway with an inscription of Pepi I. He believes that it may even have been the sanctuary of the original temple. "If anything of the primitive sanctuary has been preserved, it is in the crypt, hidden under the pavement, on which rest stately columns and majestic arches." The volume is deficient in regard to the total absence of any information on all these most interesting points; in fact, although so much laudable attention has been given to the sculptures, no systematic effort appears to have been made to determine the actual form of the festival-hall or of its architectural design. Indeed, the actual plan even of the gateway itself seems to have been left undetermined, although, from the mass of material which has been found, it seems all but impossible to believe but that its foundations must exist, if not wholly, at least to such an extent as to enable an explorer with some architectural knowledge to determine its actual form. Even its position in relation to the festival-hall is undetermined, and our author offers his readers two conjectural plans. If it were not one, then it would be the other.

The Sed Festival was a very ancient rite. It is on record as early as the time of King Pepi, of the sixth dynasty, and at that remote period we already see the king represented with the flail and the crook, like Osorkon, when he is carried in his litter; also, Pepi wears alternately the northern and southern head-dress as it is at Bubastis. The festival was celebrated in honour of Amon, although he was not the god of the city of Bubastis Amon was the god of the temple under the eighteenth dynasty. He was nearly superseded by Set under Ramesis II., and he is still found occasionally in the sculptures of Osorkon I. with other gods of Egypt; but already under his reign Bast had become more and more the divinity of the place, until, in the time of Osorkon II., she appears everywhere as the divinity of the city, except in the festival-hall itself. But even here Bast is figured on the sculptures. The ceremony, which appears to have had some reference to the Calendar, seems to have taken place at intervals of thirty years, although there are reasons for believing that this period was not always exactly fixed. The elaborate nature of the ritual observed in these celebrations is amply set forth in the plates. The entire surfaces of each of the fronts of the gateway, and also the reveals, to speak architecturally, were covered with rows of minute figures, representing the personages engaged, and these extended from base to summit, commencing from below in each case, and the surfaces were thus a vast granite pictorial record of the event.

One of the inscriptions set forth that the king reconstructed the hall on the occasion of the festival, and it is probable that it was previously in ruins, although Osorkon I. had rebuilt the outer or entrance hall.

The sculptures consist of long lines of processions, preceded by groups of the king making offerings to various divinities whom he had to propitiate before the beginning of the festival. Higher up is the king, followed by his queen, Karoama, standing on a raised platform. On others we see processions of learned men. Here are the magicians; there the stewards; the pages bearing fans; the witnesses; the governors of provinces; and masses of figures which occur again and again through the many plates of the work in endless numbers. Each of the principal figures has his name inscribed in hieroglyphics, and these have been admirably translated. The form of the throne of the king on Plate ii. is curious. Its four sides are shown in four different elevations, the king being shown on the first of these only, the other sides being supposed to face the cardinal points. Plate vii. gives some curious details of various

* "The Festival-hall of Osorkon II. in the Great Temple of Bubastis." By Edouard Naville. London: Kegan Paul, Trench, Trübner, & Co., Ltd. 1892.

divinities, and many of the others contain interesting emblems, while the position of many of the figures, at full length on the ground, denotes "a mark of respect when the king or the shrine of a god is passing. In fact, we see several times that priests are lying down quite flat on the ground, smelling the ground, before the king, as the Egyptian language tersely puts it." Other figures have the fruits of the earth and of the air in their hands as offerings, others again carry the emblems of various provinces, showing that at this great national festival, envoys from all parts of the kingdom were present to take part in the proceedings. Strange as it may appear, considering the nature of the gathering, we have searched in vain through all the plates for representations of instruments of music, and we cannot find any. No rows of harpers, no processions of trumpet blowers. The figures, doubtless, proceeded with vocal music, and with continuous chants, but the absence of instruments is not a little remarkable.

The plates, and the graphic descriptions of them which M. Naville has given in clear and readable letterpress, render this book a very welcome and important addition to Egyptology, and we refer our readers to it with no little gratification. The useful society whose labours have occasioned its production may be congratulated upon this year's work, and the subscribers are doubtless contented that so much has been done with comparatively slender support. The volume, it has to be remembered, is not only a complete treatise upon an interesting event of Egyptian history, but its entire subject-matter has been brought to the light of day by the work of the Egyptian Exploration Fund. Bubastis, by its position, within easy reach of tourists, on landing in Egypt, will always be an interesting place of pilgrimage; but far more may be learned by perusal of the work before us, and of a former volume, relating to the Temple proper, than by visiting the site.

It only remains to add that the onerous task of drawing the plates from the full-sized squeezes has been accomplished by Madame Naville, and that these have been reduced by process to form the many plates of the volume.

THE MARBLES OF SAILLON, SWITZERLAND.

THE marble quarries of Saillon are situated on the right bank of the Rhone, in the Valais, close to the station of Saxon, on the Jura-Simplon railway, and about 940 mètres above sea-level, or 430 mètres above the river. They are connected with the station by a narrow-gauge funicular railway nearly three-quarters of a mile in length, the incline of which varies between 32 per cent. in the lower parts and 80 per cent. in the upper. The railway is constructed on the Riggenbach system, and the loaded wagons, by their descent from the workings, draw up the empty ones. The steel wire cable used (laid about four months since) has 120 strands, and the speed at which the wagons move does not much exceed 18 in. per second.* Blocks weighing over 8 tons have recently been lowered on this rail. About 100 yards from the bottom of the inclined plane, the sawing and polishing works are situated.

Although the Saillon quarries have been worked for upwards of fifty years, it is only within recent times that they have attracted much attention. At first the workings were restricted to a white marble, and for many years this was the only kind produced. The transport of the blocks must have been a rough and costly affair in those days. But very little interest was taken in the quarries until the discovery of Cipollino marble in them, and the announcement by authoritative architects that the new stone bore a very close resemblance to the famous Cipollino of the Romans. M. Chas. Garnier was amongst the first to recognise the value of the material, and he used it in the Paris Opera House in two shafts, placed at the right and left of the great staircase door, level with the entrance to the orchestra.* M. E. Violllet-le-Duc, amongst others, reported favourably on the Saillon Cipollino at the Paris Exhibition, 1878. Professor Jaccard† and M. E. Guinand‡ have made Saillon marbles the subject of special study.

The marbles are stated by Professor Renevier to be probably of upper Triassic age, but other geologists prefer to class them as Liassic. The beds have a considerable inclination outwards of about 35 deg., which circumstance much facilitates the operations of quarrying. The following is their order of superposition in the quarries, with the names by which the marbles are known in the market:—

g.	Swiss Portor.
	Saillon Turquin.
	Saillon Grey.
f.	Yellow Marble.
e.	White "
d.	Ribboned Cipollino.
c.	Yellowish-grey Marble.
	Black Marble.
b.	Grand Antique Cipollino.
a.	Modern Green.

a. The lowest bed (*Vert Moderne*) produces a greyish-green marble. When polished vertical to the bedding, the stone presents a light green base, with a number of thin, close, dark-green, and more or less broken lines running through it; a peculiar network pattern results. Sections parallel to the bed, naturally have a very different appearance, the light and dark greens occurring in larger irregular patches shading off into one another, the whole having much analogy with Genoa green. It is a very compact marble, and is obtained in large blocks; the thickness of the bed now worked is about 9 ft.

b. The Grand Antique Cipollino occurs in a bed about one yard in thickness; its ground is a yellowish-white, having green, violet, and dark bluish veins, which present varying patterns according to the relation the polished surface bears to the bedding. It is very fine-grained, is susceptible of taking a high polish, and is one of the most handsome marbles in the market. Its subdued tones form a great relief when contrasted with the flaring, vulgar marbles so commonly used, and which have done more than anything else to bring marbles into disrepute for decorative purposes in recent years.

c. The Black marble at the base is slightly argillaceous, dense, and schistose in structure; whilst the upper portion is a yellowish-grey stone. Their total thickness is about 9 ft.; they are of little commercial value, in consequence of frequent cracks and fissures.

d. The Ribboned Cipollino is distinguished from the Grand Antique by reason of the colours being more accentuated, and it does not present such a rich appearance, though a fine effect is produced when it is made up into columns. The ground of this marble is slightly yellower; its tint has been compared with that of old ivory. The average thickness of the bed is 4 ft.

e. The White marble bed is about 5 ft. thick: it is fine-grained, dense, very homogeneous, slightly translucent, and at first sight is not unlike some varieties of Carrara. It is not saccharoid, however, and its texture is otherwise very different to the well-known Italian marble. The Saillon White is not of much value for statuary, because of the numerous cracks and fissures with which it is permeated.§

f. The Yellow marble has greyish-violet veins, is about 6 ft. in thickness, but large blocks cannot be obtained.

g. The three marbles included in this division are tinted different shades of grey, with yellow or white veins. The upper part is darker-coloured than the middle and lower. The Saillon Turquin is a handsome stone, its white veins being both sharp and cloudy, presenting in certain sections a very weird appearance.

The structure of the Saillon marbles has been induced by metamorphic action, but there seems to still remain rough indications of their former character in the field, although the alteration has been complete enough to obliterate all traces of fossils. Examined under the microscope, the marbles exhibit a remarkably uniform grain, sprinkled with small fibrous masses of magnesian and ferrous silicates. The magnesian silicates polish with the same facility as the carbonate of lime, of which the stones are almost entirely composed.

Professor L. Tetmajer, of the Swiss Federal Office for the Examination of Building Materials, Zurich, has experimented on the crushing strength of the various Saillon marbles, but we need not give particulars. As might be imagined with such dense materials, they all come out at figures much in excess of anything they would be required to withstand when built up. The weight of a cubic mètre of the stone is 2¾ tons.

In a report by M. Maurice Lugeon (of the Lausanne University), the MS. of which is before us, the marble beds are stated to be practically inexhaustible. His observations lead him to believe that the following quantities are yet available without altering the machinery as at present disposed:—

	To be quarried:— 1. *In the Open.* Cubic mètres.	2. *In Galleries.* Cubic mètres.
Modern Green	2,150	1,813
Grand Antique Cipollino	600	410
Ribboned ditto	520	120
	3,270	2,343

Speaking of the waste and débris of the quarries, M. Lugeon points out that excellent lime could be manufactured from it, especially from the White beds.

Good examples of the Saillon marbles may be seen, in addition to those at the Opera House mentioned, in the church of St. François Xavier, Boulevard Montparnasse, Paris; Nôtre Dame de Fourvières, Lyons; and in the Theatre, Geneva. Since its introduction into England it has been used, amongst other places, in the new Greek Church, London; University Examination Schools, Oxford; and we understand that the new pump-room at Clifton will contain twenty columns and twenty-four pilasters, each 15 ft. in height, of Saillon Cipollino marble.

NOTES.

THE annual public exhibition of the students' designs at the Royal Academy took place on Monday last. As far as architecture is concerned, the department to which we are bound to give the first attention, we must say that the results are very poor, and do not go to support the President's felicitation on the quality of the work sent in. The principal subject was a design for "a small country church in a scattered moorland district," for which Mr. Jas. S. Stewart obtained the travelling studentship, and his design was certainly the best, but none of the competitors have in the least grasped the idea of the kind of building which should answer to such a title, nor are the drawings in other respects more than a very ordinary set. The measured drawings of the north porch of St. Paul's, by Mr. R. A. Reid and Mr. Kirby (first and second silver medals) are good and careful pieces of work. But it certainly appears that architecture is in a very languishing state in the Royal Academy, and that it would be almost better to discontinue the profession of the study of this subject if nothing stronger can be elicited than is to be seen this year. In the department of landscape the pictures for the Creswick prize are a very creditable set, and the prize one, by Mr. Siegfried M. Wiens, has fine qualities,

* *Gazette du Valais*, August 31, 1892, p. 3.

* M. Chas. Garnier, "Monographie de l'Opéra de Paris," fasc. 2, p. 118.

† Jaccard, "Études Industrielles—Le marbre Cipollin antique de Saillon," 1879.

‡ Guinand, "Bull. Soc. Vaudoise des Sciences Naturelles," t. xvi. p. 599 *et. sqq.*

§ M. Tribolet, "Bull. Soc. des Sciences Naturelles de Neuchatel," t. xii. (188'), separate paper, p. 22.

especially in the clear open-air effect of the middle distance, and is a picture pleasant to look at. The competition for a cartoon of a draped figure (subject, "Mary Magdalen at the Sepulchre") has been won by Mr. Lawrence E. Koe, with a fine drawing of a figure which is both pathetic in feeling and decorative in design; and we may add that there is no other figure in this competition which can pretend to compete with it. The competition for a design for the decoration of a public building has been better contested; the design to which the prize has been awarded, by Miss Beatrice Parsons, is no doubt the best both in the composition and in the design and drawing of the life-size single figure, but there are two or three others of decided merit, Nos. 126 and 124 among them (the names of the prize-winners only are given). The subject of "Astyanax hurled from the battlements of Troy in the presence of Andromache" is rather a violent one for sculpture, which has been treated with a great deal of spirit at least by several competitors, and Mr. D. M'Gill, in the group to which the prize has been awarded, has contrived to group the figures in a sculpturesque manner without losing energy of action. In the competition for a "model of a design containing figure and ornament" Mr. C. J. Allen has worked up the well-worn acanthus scroll (Renaissance pattern) into a very pretty decorative composition, but students in this branch should be encouraged to try new materials for their decorative foliage. "The Judgment of Solomon" was the subject for the Armitage prize for a design in monochrome for a picture; a suggestive subject enough; the competitors seem to have been curiously afraid of architectural surroundings to it, for which the situation gives every excuse, and which might have been turned to good account in the design.

THE December number of the *Classical Review* deserves the attention of all those who are interested in the Homeric question, from its archæological side. Mr. Cecil Smith does good service in his full and clear summary of the controversy as it now stands between Mr. Petrie and Mr. Cecil Torr. This controversy has for months been winding its way through the *Academy*, the *Athenæum*, and the *Times*, and Mr. Smith's summary is put together "in view of its continuance over yet another six months." The evidence on either side is exceedingly complicated, the more so as it is involved in questions of Egyptology, so that Mr. Smith's lucid and unbiassed statement will be specially welcome. The point at issue is, it will be remembered, that Mr. Petrie claims for Egyptian discoveries that they enable us to assign a date of about 1400 B.C. to the Mycenæan civilisation, while Mr. Torr argues that this conclusion, be it right or not, is not warranted by the evidence as yet adduced. We may note that the "Homeric" question still further occupies the present number, as Mr. Cecil Torr, in a review of Mr. Leaf's "Companion to the Iliad," attacks Mr. Leaf's whole position, and specially his view of the relation of Dorian, Achæan, and Ionian civilisations.

WE referred last week (pages 453-4 *ante*) to a resolution passed by the Society of Antiquaries in regard to certain restoration work going on at Lichfield. We find the work in question is being carried out under the care of Mr. J. Oldrid Scott; and without undertaking to approve of all he is doing there, we must say that we think it a very unreasoning and uncourteous action on the part of the Society of Antiquaries to pass a resolution condemning the work of an architect who is himself one of their members without (as Mr. Scott assures us) giving him any notice of it or any opportunity of explaining the real facts, with which those who proposed and carried the resolution seem to have been imperfectly acquainted. The following extract from a report by Mr. Scott on the subject puts a different light on some part at all events of the work:—

"The transepts at Lichfield were built a few years after those at York, and were, to a considerable extent, copied from them, though on a much smaller scale. . . . . The transepts were entirely recast in the fifteenth century, the numerous lancet windows being, with the exception of those in the west wall of the south transept, done away with, wide windows with tracery taking their places. . . .

This work of transformation from an early to a late style was skilfully carried out with the exception of the great window in the north transept, where the wide and low arch of the new window was given a peculiarly ungraceful form, neither four-centered nor elliptical. The ancient arch stones were reused to form it, and the early jambs with their characteristic dog-tooth ornament were left untouched.

This spreading arch had had the natural effect of exerting a powerful outward thrust on the jambs and side walls, and they had given way to such a serious extent that means were taken some years since, by the introduction of a relieving arch and an iron tie, to prevent the injury from going further. This had, however, failed, and the whole of the transept end was in a most precarious and threatening condition.

What tracery this window had when first rebuilt we do not know, as it was destroyed during the siege, and was renewed by Bishop Hackett in the plain style which economy then necessitated. This tracery, in its turn, had fallen into such a deplorable state of decay that it was in the greatest danger of falling, and some restoration was imperatively called for. To renew such a meagre design seemed hardly desirable; while an attempt to replace it with better tracery, such as must have preceded it, would have been to substitute new work for old without the guidance of any evidence.

A bolder alternative was to reconstruct the Early Lancet windows with the numerous ancient stones which had been preserved in the later arch, and in doing this to remove the danger which has for so many years threatened the transept, and this plan after long deliberation has been adopted, and has lately been brought to a successful completion.

The Early English stones found were so many, and their condition was so perfect, that it has been possible to ascertain with certainty what the original design was in every particular. . . . .

So completely has it been possible to reconstruct the lancets that in the five beautiful inner arches there are only twelve new stones; all the others, amounting to some hundreds, being ancient."

Had the old work not been in so dilapidated a state as Mr. Scott describes, it would have been a reasonable question whether it should be disturbed; but under the circumstances, the late work having decayed and so many of the actual stones of the earlier work being in existence, the course pursued by the architect seems perfectly reasonable and logical. Unfortunately, archæologists are too prone, as in this instance, to condemn the proceedings of architects without waiting to find out the facts.

THE Council of the Surveyors' Institution have been entering into arrangements for admitting to membership surveyors in the Colonies who are not able to attend to pass the usual examination. The change is proposed with a view of federating the profession throughout the empire, and of affirming and defining the professional status of Colonial Surveyors; and the Council of the Institution are prepared to entertain applications for admission to membership, without examination, from surveyors holding official appointments in the following British Colonies and dependencies, where it is understood that candidates for such appointments are required, as a condition precedent, to pass an examination which can be accepted in lieu of the professional examinations of the Institution. The Colonies to which the arrangement applies, at present, are India, Victoria, New South Wales, Queensland, Western Australia, South Australia, New Zealand, Tasmania, Canada, British Guiana, West Indies, Cape Colony, and the Straits Settlements. A Colonial Surveyor will be considered eligible *ceteris paribus* if he shall have passed an examination qualifying him as an Authorised or Licensed Surveyor, or as an official, or Crown Surveyor, or Surveyor-General, in any of the foregoing Colonies and Dependencies. All Candidates will be required to furnish a detailed description of the Examination or Examinations passed by them in the Colonies, which must be signed by the candidate, and, in the case of a subordinate officer, countersigned by the Surveyor-General, the Colonial Secretary, or other chief official. The Diploma granted to a Colonial Member will bear upon the face of it a notification that it applies solely to the Colonies, and is in no sense a Diploma available for a Surveyor practising in the United Kingdom.*

THERE have of late been various discussions in the London County Council in regard to taxation of ground rent and kindred subjects. But they have lost all practical value because the decision in respect of all the schemes of the Council in regard to new methods of raising revenue lies with Parliament. We are rapidly nearing the time for the assembling of Parliament, and therefore the debates in the Council have become somewhat academic. The general view of the majority of the Council in regard to new methods of taxation, betterment, taxation of ground-rents, and so forth is pretty well understood. The point of interest is the attitude which a new Parliament will adopt towards the proposals and desired legislation of the Council. We confess that we think that the House of Commons will take a much more conservative view of the financial proposals of the Council than the Progressive party expect, but a few months will show.

THE discussion in regard to the sanitary condition of the Johanna-street Schools of the London School Board, as reported in the *School Board Chronicle*, terminated with the passing of a resolution that an official inspection of the schools should be made by certain members of the Board, with the assistance of the Medical Officer, and that they should be empowered to close the school if that were deemed necessary, and to report to the Board. This was an amendment to a previous motion to close the schools at once, and was probably the best course to take. The amendment was carried by 38 votes to 6. From the evidence previously given in the Southwark Police-court by Dr. Verdon, it would appear that he, as Medical Officer of Health, had long warned the School Board as to the insanitary state of this school, and had received an admission, in 1891, in a letter from the Board, that they "knew the closets were offensive." In that case they certainly ought not to have waited till now to take the action which they have now tardily decided on. There may be some exaggeration in the outside statements made in regard to the school, but it must have been obvious for a long time past that it was not in a satisfactory condition. The London School Board have also had under discussion the question of throwing open new schools to competition among architects, a course recommended by the Works Committee, and which we should consider advisable, provided always that the buildings should be carried out, and the plans passed, under the advice and authority of the School Board Architect as consulting architect and final authority. Any other course would be to put him in a very unfair position. We observe, however, that the Committee do not recommend a competition for a special school but for a school "capable of being erected on any ordinary site purchased by the Board;" *i.e.*, a stock plan and design to be dropped down wherever wanted. This is perfectly absurd. Every site has its own special peculiarities, for which the building must be specially planned and designed. If the Board follow the recommendation of the Works Committee in this respect they will do a very foolish thing, as they will find out afterwards.

AT this season of the year a good many technical classes under the auspices of the various County Councils are at work.

* Colonial readers can obtain all further information from the Secretary of the Surveyors' Institution, 12, Great George-street, Westminster.

But it is quite clear that a great deal more care and system are required in this matter if it is to be successful, or even to survive. Technical education is a necessity for the country, but it is a business and not a mere amateurish pastime. If it becomes,—as it is becoming,—of this character, it cannot fail to come to an untimely end in rural districts, for the ratepayers will demand that the money allocated to the County Councils for the purpose should be spent in relief of the rates. We have been informed of cases which show a complete inappreciation of the proper methods of technical education,—such as the teaching of chemistry to a purely agricultural audience entirely unable to understand a word of the lecture, which is followed by comic songs and smoking. In other instances technical classes have been attended only by young ladies. No money should be allowed to be spent on any place unless the arrangements have been first submitted to some competent person on behalf of a County Council, who will certify that the arrangements are satisfactory and that the money will be well spent.

A SOMEWHAT confusing Order was issued last week by the Board of Trade with reference to the new railway rates. The revision has occupied a long time, and it would appear that the magnitude of the task has been under-estimated in some quarters; for, in spite of the extended time allowed, some of the companies will not have completed their new books by the end of the year. By the Order alluded to they are allowed two months longer, and are relieved of the necessity of giving notice of additions made to the books during that period, provided that a "general" notice is given by placard and advertisement of any alterations to come into force on January 1. This is on the understanding that rate-books are to be available for inspection at the stations, and that skeleton forms similar to the pages in the rate-books shall be supplied to applicants at a reasonable charge, and also such extracts from the books as may be required. It appears from a letter addressed to the Press by the secretary of the Mansion House Association on Railway Rates that some of the provisions of this Order were adopted on the recommendation of that body, while others were inserted at the suggestion of the Railway Companies' Association. Other suggestions were made which did not find favour with the Board of Trade, and the fact of the Order being in this way the joint production of the Associations, and the Board may perhaps account for its rather obscure wording.

AN old contributor to our columns, who knew St. David's Cathedral in 1844, writes, with reference to our recent illustration of it:—"No one except a person who remembers the dear old Cathedral as it was half a century ago, can well realise the change for the better that has been wrought by the work of conservative restoration which has been effected within the period. In 1844 the interior was covered from end to end by a whitewash of dingy brown, and there was not a bit of colour in the whole building, either on the walls, or the tombs, or in the windows. The greatest credit is due to the present Bishop, along with Sir Gilbert Scott, for rescuing the structure from the ruin to which it was rapidly tending. The first ten pounds expended on its repairs, it may be interesting to learn, were raised at Oxford, being contributed by personal friends of the future Bishop, then Mr. Basil Jones, of Trinity College, and of Mr. E. A. (afterwards Professor) Freeman, who jointly wrote a historical and archæological work on "The Antiquities of St. David's,"—a work now scarce and valuable. The publication of this work gave to the movement an impulse throughout the Principality, which has continued from that day to this. There is a coach or omnibus daily to St. David's from Haverfordwest, but the distance is sixteen miles, and the road is so bad that the journey occupies between three and four hours! In fact, at his palace at Abergwilly, near Carmarthen, the Bishop is nearer to his seat in the House of Lords than to his seat in his own Cathedral."

IN the Board-room of St. George's, Hanover-square, Vestry Offices, Mount-street, hangs a finely executed plan of the parish, "surveyed and delineated in . . . . 1725, by John Mackay, senr., and junr., mathematicians, of Saint James, Westminster." It is drawn to a scale of 10 poles in an inch, upon sheets of vellum, and has been recently restored. In the lower left-hand corner (east) is set out the Lord Salisbury's property, watered by affluents of the Aye brook, which the State bought in 1799, and for, it is said, 12,000*l.*, from James, seventh Earl and first Marquess of Salisbury, for the erection thereon of a "Penitentiary House for London and Middlesex," which, in 1843, by statute, was re-named Millbank Prison. Since some misconception seems to prevail as to the author of its design, we may here state that eighty years ago the Government awarded premiums of 200*l.*, 100*l.*, and 50*l.* to Mr. Williams, teacher of military drawing at the Military College, Mr. C. A. Bushy, and Mr. Hervey, respectively, for their designs. On March 7, 1868, we published a letter written by a correspondent who stated that the entire fabric,—excepting the gateway, designed by Thomas Hardwick,—was built after Williams's drawings, in the making of which our correspondent helped him. The late George Godwin ascertained, further, from credible sources, that in or about 1816 Sir Robert Smirke, R.A., was deputed to make good the failing foundations of the gateway and other portions of the prison. This he did by laying down concrete. In the end Smirke rebuilt the six radiating pentagonal blocks. Hence, having regard also to the nature of the soil, it is likely, as is said, that the prison cost nearly half a million sterling. It is often stated that to Jeremy Bentham that particular feature of the plan is due: it has been claimed for his brother, Sir Samuel Bentham, by Sir Samuel's widow in letters addressed to and printed in this journal. Nearly two years ago the Secretary of State offered to sell eight acres of the ground to the London County Council for 40,000*l.*, for the building of artisans' dwellings. At the north-eastern corner, by Grosvenor-wharf, of the marshy ground which forms the prison-site stood Peterborough, afterwards Grosvenor House, built by John, Lord Mordaunt, advanced Earl of Peterborough in 1628. That house subsequently became part of the rich heritage of Sir Richard Grosvenor, Bart., as eldest son of Sir Thomas, who married Mary, only daughter and heir of Alexander Davis, of Ebury. The plan of 1725, and one of Ebury lordship, by Henry Morgan, 1675, in the Crace collection, go to show that Pennant does not quite correctly describe Peterborough House as being the "last dwelling in Westminster." A view of it is contained in the "Crowle" Pennant, British Museum. The house was rebuilt by one of the Grosvenors, and pulled down in 1809.

IT is proposed (as will be seen from our advertisement columns) to raise a memorial at Louth to the late Mr. James Fowler, towards which the Vicar of St. Michael's, Louth, hopes that some of the late architect's numerous friends in the profession may be willing to subscribe. It is suggested that a suitable form of memorial would be a screen in the church of St. Michael, a church built by him, and that the design should be entrusted to his son, Mr. Reginald Fowler. Subscriptions can be sent to "The Rev. E. L. Gardner, Louth, Lincolnshire."

THE collection of water-colour drawings by Mr. Arthur Severn, on view at the Society of Fine Arts, is a remarkable one in its way, but many of the drawings impress us rather too much as attempts to paint special effects of light which have not altogether succeeded. We hardly understand what is the intended effect of "Barges, Coal Strike" (5) where the decks, tops of bulwarks, and cargo of the coal barges all show with a pale light, under a strong sunset light: the effect seems entirely unreal. A want of atmospheric effect in the skies is also to be felt; "Sunset over Coniston Old Man" (8) suggests a conflagration; "Storm Cloud passing over Coniston Water" (17) is a grand little picture, and clouds under certain conditions of atmosphere do assume an almost crag-like solidity, but surely it is a little overdone here. Among the finest things are "Gloomy Sunset, over Skye" (13); "Mussel Gatherers hurrying from the Tide, Morecambe Bay" (57) (in both these the sky seems rather too solid); "Moonlight Clouds, Hawkshead" (65), a very remarkable study of effect, and "Waves breaking by Moonlight" (76), still finer, one of the most real pieces of moonlight effect we have ever seen. The violent swirl of the brown water in "Spate in Glen Cannich" (80) is powerfully given, and "Dead Calm" (87) is a beautiful little sea study.

THE water-colour drawings by Mr. H. B. Brabazon, now on view at the Goupil Gallery in New Bond-street, are mostly mere sketches, in some cases very rough sketches: but they show a very remarkable perception of colour and effect, and are the work of an artist of independent genius. We object, certainly, to any pretence of representing important architectural monuments with such an utter absence of any indication of detail as is the case with some of these; one or two sketches called "The Taj," for instance, are no more than ghosts of the celebrated building, without an indication of its architectural character except in outline or mass, and even that is not correctly given. But some of the sketches in which cities are treated more *en masse*, as "Venice, early Morning" (7), "A Canal, Venice" (17), "Venice, a Dull Day in October" (64), are beautiful in colour and atmosphere. Among the more powerful sketches without distance may be named "A Campo in Venice" (24); "Grand Canal, Venice, after a Storm" (27), and "A Palace on a Side Canal at Sunset" (46); the latter is a splendid piece of broadly treated effect. All who are interested in water-colour art should see these drawings.

WE congratulate the Royal Academy on having elected Mr. Alfred Gilbert a full R.A.

PRIVATE BILLS, AND PROVISIONAL ORDERS: SESSION OF 1893.

WE give below a summary of the more important of the measures for which application will be made by the customary deposit of printed Bills and schemes, with plans and maps, before the close of this month. It will be noticed that proposals for new railways, in London and the provinces, are few, whilst electric-lighting projects are less numerous.

London County Council.—The Council apply for five Bills: in respect of open spaces; the removal of gates, bars, and similar obstructions; an owners' improvement rate or charge; local improvements; and general powers. The bars, gates, and posts stand in eighteen parishes, and are sixty-nine in number. They include those in Lowndes-square and Cadogan-place; Warwick-place, Bedford-row, and Featherstone-buildings; Highbury-grange, Aberdeen-park and road, and St. John's-park, Upper Holloway; Norfolk (2) and Kensington Gardens squares, Stanhope-street, and Craven Hill-gardens; Eaton-square (4), Belgrave-road (2), Eaton-terrace, Pont-street, and Wilton-place; Harewood-place, Oxford-street; Vigo-street; Harley-street, Devonshire-place, and Park-crescent (2)—Marylebone-road ends; St. Paul's-road (2). Oakley (2) and Harrington squares, St. Pancras; Taviton, Endsleigh, Doughty, Arthur, Heathcote, and Frederick streets, St. Pancras; and Princes-gardens and

Little George-street, Westminster.* The local improvements comprise the new street ("Council-broadway") from High Holborn to the Strand; the rebuilding of Vauxhall Bridge, with new approaches, and construction of a temporary wooden bridge at Millbank; a southern approach to Tower Bridge; the new ferry between Ratcliff and Rotherhithe; a widening of Wood-lane (south end), Uxbridge-road, and of the southern approach to Woolwich ferry. Open spaces: for acquiring Hackney Marshes, between Hackney Cut and the river Lea, including "Bully Fen," between Temple Mills stream and the (old) river Lea; some land between "Fernside" and "Kirkstall Lodge," Tulse Hill, to make an additional entrance into Brockwell Park; the Albert Palace, Battersea, with all the buildings and ground, as a place of public recreation and resort; Hilly Fields, Brockley which they propose to take over from the Corporation and the Bridge House Estates Committee for a nominal, or other, consideration; York Water-gate, and for adding to the Embankment garden the strip of land behind the gate (formerly known as Villiers-walk); and Lincoln's Inn Fields, about seven acres, now belonging, reputedly, to the Benchers of the Inn, or their lessees; and for repeal of 8 Geo. II. c. 26, which enabled the proprietors and inhabitants of houses in the Fields to levy a rate upon themselves for enclosing, cleaning, and adorning the said Fields. Also, for conferring powers on Vestries and District Boards to erect buildings of various kinds on open spaces belonging to them or under their control. The Council's Improvement Rate or Charge Bill provides for imposing a new rate or charge on lands or property, or its owners, the proceeds to be applied in aid of the cost of improvements and works of public utility. The rate or charge will be collected wholly or in part from occupiers or in such other manner, and not beyond such limit, as the Bill may define. General Powers: this Bill relates to the election of members to represent the Council upon the Thames Conservancy Board, and of additional members (of the Council) upon the Lea Conservancy Board; licences for the erection of dwelling-houses in districts lying below the high-water line, or subject to tidal floods; the electric lighting of Waterloo and Westminster Bridges, and Victoria Embankment; the alteration of the London Sky-Signs Act, 1891, and the extension of its scope to other structures and erections over, or attached to, buildings, or placed on lands; penalties and punishment for giving false alarms of fire to the fire brigade stations; a re-arrangement of wards or sub-divisions of parishes and districts in the county of London, other than those dealt with by the City Parochial Charities Act, 1883, with powers to frame and conduct schemes relating thereto; and for powers to compensate any persons who may be injured by working under the compressed air system in the Blackwall Tunnel, or their wives and children.

London and Suburbs: Communication and Conveyance.—By the Great Eastern Railway Company for a line from High-street, Stratford, to their Colchester main-line by the Pudding Mill river bridge; and one from Leyes-road to the Gas-light and Coke Company's Beckton Railway; the enlargement of the Liverpool-street station hotel; and the acquisition of numerous parcels of land. Metropolitan District Railway:—To abandon the West Brompton Junction line, as authorised by their Act of 1881; and for extension of time to complete the Acton Junction Railway (1878). Clapham Junction and Paddington Railway:—For an underground railway and subway from Clapham Junction to Bishop's-road, Paddington, with a branch subway from the Royal Albert Hall to Exhibition-road; on a 4 ft. 8½ in. gauge, and with cable or electrical motive power. The City and South London and the London and Blackwall Railway Companies ask for an extension of the time and powers now limited by their Acts of 1890, and 1885 and 1889, respectively; so also the Harrow and Paddington Tramway Company, in respect of their Act obtained last year. The Edgware-road and Victoria Railway: for an underground line from the high-road, Kilburn, to Vauxhall Bridge-road, the motive power to be cable traction, electricity, or any power other than that of steam locomotives. West Metropolitan Tramways Company: a Bill for further powers, and to work by animal, cable, steam, electrical, mechanical, or other power, over their lines in Chiswick, Hammersmith, and Acton. The Metropolitan Outer Circle Railway desire to abandon all further action under the Act of 1888, and to obtain an extension of time under the Act of 1891,—see the *London Gazette* of November 22 and 25 last. Lea Conservancy: For improving and rendering navigable the (old) River Lea, and the Waterworks, City Mills, and Pudding Mills rivers. The Board of Trade have approved the Council's resolution to acquire the tramways authorised by the North Metropolitan Tramways Act, 1871.

Electric Lighting. — The Kensington and Knightsbridge Electric Lighting Company promote a Bill for confirming an agreement made with the Chelsea Electricity Supply Company (1889), whereby the latter's undertaking is transferred to the former company. Application will be made to the Board of Trade for provisional orders, subject to confirmation by Parliament, under the Electric Lighting Acts of 1882 and 1888, by the Islington Vestry, and the Poplar and Hackney District Boards in respect of the storing and sale of electricity, the mains to be laid along High and Upper streets, Islington, Holloway and Seven Sisters roads, Kingsland and Stoke Newington High-streets, Stoke Newington-road, Mare-street, and Dalston-lane; and along East India Dock-road, High-street, Poplar, and Bow, Coborn, Tredegar and Fairfield roads. Also by the Holloway Electricity Supply Company, to supply electricity to the northern parts of St. Mary, Islington, parish; the Hammersmith Vestry for the lighting of the parish; and by the Urban Sanitary Authority, Beckenham, for a like purpose.

Miscellaneous. — Paddington Recreation Ground: for purchase and transfer to the Vestry of the ground bounded by Carlton-road (north), Elgin-avenue (south), Portsdown-road (east), and Shirland and Kilburn Park roads (west), and to provide for contribution by the vestries of Paddington, St. John, Hampstead, and St. Marylebone, the Willesden Local Board, the Ecclesiastical Commissioners, and the Paddington Estate trustees. This ground extends over 20½ acres, and forms part of the land that was acquired ten years ago, and has been used for five years past as a cricket and children's play-ground. It is stated that of the purchase-money, 50,880*l.*, a balance of 1,500*l.* remains to be raised, and must be forthcoming before the end of the current year. Conditionally upon this, the London Parochial Charities trustees will add 1,000*l.* to their existing promise to give 1,000*l.** A Sewage Board for Staines and Chertsey ask to construct filtration and precipitation works, for prevention of sewage discharge into the Thames, and to take lands at Walton and East Molesey.

Hornsey Local Board. — For further and better provision as to drainage, flooding, nuisances, infectious diseases, and other sanitary matters; also for regulating the erection and maintenance of sky-signs, and compelling the taking down and removal thereof, and for the licensing thereof, and in respect of street-hoardings and advertisements.

Post Office.—The Postmaster-General seeks for powers to acquire sites for the postal service on the east side of Young-street, Kensington; Bovay-place, Holloway (extension of the telegraphical instrument factory); and Carter-lane and Bell-yard, by St. Paul's (extension of the Savings Bank, new buildings).

West Ham. — The Corporation ask for a variety of general purposes relating to municipal improvements, and the establishment of a Technical Institute, a Free Library, and a local museum.

St. George-the-Martyr, Southwark. — The Vestry promote a Bill to repeal 47 Geo. III., c. 132, and 50 Geo. III., c. 45, to abolish the rector's rate thereunder, and to obtain powers for providing a fund out of the general rate instead. The making of the rector's rate has occasioned considerable dissension in the parish, and particularly in March last, when several members of the Vestry declined to vote.

Crown Lands.—For altering 10 Geo. IV., c. 50, and certain other Acts, to enable the Commissioners of Woods to grant leases of parts of the royal forests for the making of roads, tramways, allotment gardens, recreation grounds, water, drainage, lighting, or similar works; and for transfer to the Ecclesiastical Commissioners of the trusts now held by the Archbishop of York and the Commissioners of Woods in England to Sunk Island (river Humber), and Portland, Oxford, and Welbeck chapels (St. Marylebone).*

The Provinces: Communication and Conveyance.—Dover Undercliff Reclamation: a Bill for a seaside drive and walk between East Cliff-terrace, Dover, and Ness-point, St. Margaret-at-Cliffe. The road will be nearly four miles long, and the works are estimated to cost 200,000*l.*† Birmingham, Kidderminster, and Stourport Railway Company: for new lines in the counties of Worcester, Stafford, and Warwick. A sea-shore electric-railway from Brighton to Rottingdean. Hunslet Railway Company: new lines in Yorkshire, West Riding. North-Eastern Railway: For amalgamation with the Hull Docks Company, and incorporation of the Dock proprietors with the Railway Company. Great Eastern Railway Company: A line from Barnwell, Cambridge, to Cherry Hinton, to connect their Newmarket branch and Cambridge and Ely main lines, and taking part of Coldham Common, Barnwell; and an extension of the trawl-basin and fish-market, with a new harbour swing-bridge at Lowestoft. Midland and Great Northern Railway Companies: For taking over the whole undertaking, works, plant, rolling-stock, &c., of the Eastern and Midland Railway Company, known as the Mundesley Branch, with which the Great Eastern Company propose to make a junction from Walsham on their East Norfolk line. We may here mention that the Midland Company are building a new bridge over the Ouse, and when that is ready will begin a new station at Bedford. Other works in hand will provide for separate goods and passenger lines between Leicester and London. London and South-Western Railway Company: A Bill for constructing a graving dock at Southampton adjoining the Empress Dock, and a quay, about 1,200 yards long, alongside the rivers Itchen and Test. The Bill provides for a further widening of the lines running into Waterloo terminus, and a large number of minor projects, affecting, for the most part, the purchase of parcels of land. Lancashire, Derbyshire, and East Coast Railway: For certain deviations from various lines authorised by their Act of last year, and the straightening or deviation of the river Rother for about 250 yards in Killamarsh and Beighton parishes, Derbyshire. Abandoned: Brighton, Rottingdean, and Newhaven Direct Railway Acts, 1886-7; Towcester and Buckingham Act, 1889; and South Hampshire Railway and Pier. Dover and Calais Submarine Tubular Railway, for laying two or more tubes from Abbot's Cliff to Sandstone Cliff, one mile south of Cape Griz-Nez. For Bills to enable the Manchester Ship Canal Company to raise more capital, and the Corporations of Manchester, Salford, and Oldham to lend to the Company, upon debentures or other securities.

Electric Lighting.—Application to the Board of Trade for provisional orders is made by the British Electric Light Company to supply electricity to Newmarket; the Reading Electric Supply Company to supply electrical energy throughout the Borough; Eccles and Colchester Corporations to make, store, and sell electricity in their respective areas; the Manchester Edison-Swan Company to supply Altrincham and Bowdon districts; and so similarly by the Bridgend Local Board, and the Newcastle-on-Tyne Electric Supply Company. Brighton and Hove Electric Light Company, a bill to make and supply electricity to Brighton and Preston.

Water Supply.—Bills for extension of area, and new works at Devonport, East Stonehouse, Plymouth (by the Corporation), Bodmin, Poole, and Bilston (by the Commissioners). The Chatham Corporation desire to take over the Brompton, Chatham, Gillingham, and Rochester Waterworks; the Frimley and Farnborough district wish for powers to supply water to Farnborough, Crondall, Yateley, Frimley, and

* Three or four months ago, 15,000*l.* was contributed by St. Pancras Vestry (5,000*l.*) and the County Council (10,000*l.*) for the roadway, with its gate, belonging to University College, at the northern end of Gower-street.

* The Vestry announce that they will deposit this Bill only if 700*l.* of the balance be assured by the 21st inst.

* St. Paul's, in Great Portland-street (1831), occupies, it is said, the site of Marylebone Basin, which was made in 1668, to supply Covent-garden, St. Martin's-lane, &c., with water, and filled in *circa* 1765. St. Peter's, Vere-street, was built for Lord Oxford, after Gibbs's designs. It has been re-seated and re-decorated by Mr. J. K. Colling, architect.—See the *Builder* of December 16, 1882.

† A contract of 415,000*l.* has just been made for the first portion of the new harbour; the South-Eastern Railway are about to take a large site at the town's west end for their new terminus; and the Corporation will spend about 50,000*l.* on street improvements.

Ash; the West Hampshire Water Company, to supply Christchurch, Sopley, Ringwood, Milford, Holdenhurst, Brockenhurst, and Lyndhurst.

Harbours, Piers, &c.—A Bill for a pier and jetty, 7,790 ft. long, at Weston-super-Mare, opposite the end of Regent-street. Provisional Orders, by the Deal Harbour Board Company, for a tidal harbour at Deal (at the north end of the town, between the Coastguard Barracks and the ruins of Sandown Castle), having two piers, 700 ft. long and 500 ft. apart at their shore ends; a pier-jetty and landing-place at Southwold, opposite South-green; a pier at Garth-point, Bangor; and the lengthening by 200 yards of Sandown pier, I. of W., and to render it available for passengers, cattle, goods, and merchandise. Fishguard Bay Railway and Pier Company, a pier or breakwater, 350 yards long, with a sea-wall, at Llanwnda, Pembrokeshire. For two piers at Morecambe, one (1,403 yards) from the end of Regent-street, the other (850 yards) opposite Alexandra-road; and one at Tenby, from White Sandgate, opposite St. Catherine's-terrace.

Municipal.—Bristol Corporation: new docks and other works at Avonmouth; new streets in the parish of St. Augustine-the-Less, and the widening of College-green (south side) for the whole length of the parish churchyard. For local, sanitary, and other improvements at Salford, Harrowgate, Liverpool (including sky-signs), York; Wigan, Blackpool, and Bolton (including tramways), and St. Helen's: Manchester, a provisional order for tramways in Manchester and Cheetham townships; Rochester, to take over the local waterworks, and to extend the borough limits to include Strood, Frindsbury, and St. Margaret's; Sheffield, to widen High-street and Market-place between Fargate and Change-alley, and Fruit-market between Change-alley and Fitzalan-square; and for provisional orders for tramways at Plymouth, Great Yarmouth, and Hull.

THE ROYAL COMMISSION ON METROPOLITAN WATER SUPPLY.*

Evidence of Mr. Deacon, C.E., on the Thames Conservancy Reservoirs Scheme.

Among the witnesses examined at one of the last sittings of the Commission was Mr. Geo. Fredk. Deacon, C.E., Consulting Engineer to the Corporation of Liverpool, for whom he projected and carried out the Vyrnwy waterworks in North Wales which supply that city. It had been referred to him, he said, by the London County Council to report upon the nine reservoirs on the upper tributaries of the Thames, suggested on behalf of the Thames Conservancy, either to supply London direct or to feed the river in the summer months. He had examined the ground, and made himself familiar with it.

The most marked peculiarity of the tributaries, Mr. Deacon said, is the smallness of the summer flow in relation to the rainfall. That arises, in most cases, from the very jointed nature of the rocks. Much of the water escapes, and is caught in the streams at lower points, or finds its way into the Thames. From gaugings, he is satisfied that the loss of rainfall will be much larger than has been estimated, and that during the summer there would be great loss from the reservoirs by evaporation. The reservoirs could be made, except, perhaps, that of the Sherborne, which would require a puddle wall all round. But waterworks' reservoirs ought to be twice or thrice the depth that these would be, and have much steeper sides. The water would grow an immense amount of vegetation, which would make it, not worse for the Thames, but undesirable for direct supply. The Windrush might be made watertight, but not the Cherwell; the Sor Brook would be fairly satisfactory, but the marlstone would be within the reservoir; the Swere would be exceedingly doubtful without a puddle trench all round it; Nether Worton or Deddington is like Sor Brook; in the case of the Dorne, being on the oolites, water would not run out so rapidly as through marlstone, but it would not be watertight; and it is much the same with the Glyme; but the Thame on the Kimmeridge clay is much better, although it would be a shallow, flat reservoir. In all cases there are small villages draining into the rivers. Still, after examining a number of streams he concluded that Messrs. Marten & Rofe had found the best places. But the reservoirs would not do the work it was proposed to put on them. Artificial reservoirs like those at Staines (proposed by the companies) would keep the water in a better condition. For details Mr. Deacon referred to statements he had handed in.

In one statement, Mr. Deacon said that the Vyrnwy scheme was the outcome of several projects which, at the instance of the Corporation of Liverpool, he investigated about the year 1876. He has been largely consulted in connexion with the water supply of other places. He has made a special study of the flow of water from the ground in relation to the rainfall, and for many years has been in the habit of gauging streams and comparing those gaugings with the respective rainfalls on the areas they drain. In the case of the River Vyrnwy, such gaugings have been carried on almost continuously for a period of fourteen years; and, in the case of the River Severn at Worcester, for a period of twelve years. For the purposes of the present inquiry he has made an examination of the Thames basin, or rather, of such parts of it as were in the least likely to be suitable for the formation of reservoirs for the collection of potable water. The configuration of the surface of the ground over the north-west portion of the Thames basin is in some places such that, where the geological formation would ensure watertightness, it would be possible to construct certain reservoirs, each of considerable area, but not of considerable depth in relation to that area. But pervious and impervious strata are so mixed up throughout the district in question that there is in most cases considerable doubt:—1st. As to the watertightness of the formations which would be covered by the water of each reservoir. 2nd. As to the condition of the rocks beneath the area from which each reservoir would receive its supply, and, therefore, as to the proportion of the otherwise available rainfall which would pass through the strata without entering the reservoir.

On commencing inquiry at the instance of the London County Council as to the existence of sites for large reservoirs on the tributaries of the Upper Thames, Mr. Deacon at first confined his attention to the contour of the ground, and to the probable condition of the bottom of each supposed reservoir site. He did not expect to find the abnormal relation between the rainfall and flow off the ground apparent at once without exact gaugings. In the course of the investigation, however, he was so struck by the obvious smallness of the flow of most of the streams in relation to the rainfall, that he subsequently made arrangements for gauging a number of them. In all, about forty-five gaugings have been made and compared with the rainfall; but a number of the areas so tested have proved to be entirely unsuitable for reservoir construction. The least objectionable sites are to be found among the nine which have been laid before the Commission on behalf of the Conservators.

Mr. Deacon at first believed, but afterwards doubted, that the reservoir on the Thame at Hardwick would yield about the estimated quantity; and the yield of the others is exceedingly doubtful. The proportion of the rainfall which could be rendered available, even if the other reservoirs were made watertight, is abnormally small, and its actual value can only be ascertained by continuous gauging of the streams. The suggested reservoirs are all shallow. From their large areas the evaporation would be considerable, and this loss, considered in conjunction with the insignificant summer flow towards most of them, would render it necessary to provide a larger number of days' storage than would otherwise be required. The reservoirs drain much arable land, and the populations grouped in villages above some of the sites are considerable. They are not situated at sufficient elevations to supply the Metropolis without pumping. He is of opinion that reservoirs upon these, or upon other sites in the Thames Valley, will never prove satisfactory sources of supply for the Metropolis.

Abnormal Relations between River Flow and Rainfall.

In a supplemental statement embodying statistical and other details, Mr. Deacon says that he has analysed certain rainfalls and discharges, which, in his belief, have an important bearing upon the suitability or otherwise of the upper valleys of the Thames for the collection and storage of water. His statement is accompanied by four tables, which may be described:—Table A gives the discharge in percentages of one cubic foot per second per 1,000 acres on certain days from the areas suggested on behalf of the Conservators as suitable for the construction of reservoirs; the accumulated rainfall during one, two, three, four, five, and six previous days respectively, and the accumulated rainfall during one, two, three, and four previous weeks respectively. Table B gives the corresponding results for several other Thames tributaries not suggested as sites for reservoirs. Table C gives for a normal drainage area in North Wales a number of examples of discharge selected as having followed upon rainfalls corresponding fairly with the rainfalls in Tables A and B. Table D gives the maximum and minimum rainfalls, discharges and losses, in periods of twelve months, on the basin of the Thames down to Teddington, and on the basin of the Severn down to Worcester.

The most remarkable feature of the various summer gaugings of discharge of the upper Thames tributaries is their small volume, and the great uncertainty of that volume in relation to the rainfall, which renders it impossible to predict its amount, even within wide limits. The uncertainty applies equally to the areas in Table A, upon which it has been proposed to place reservoirs, and to those in Table B, with respect to which no such suggestion has been made. *Ceteris paribus*, the larger the area the less will be the intensity of the flow off the ground per unit of area following upon any given summer rainfall considered in detail, and this must be borne in mind in making any comparison between the discharge from the tributaries within a limited period, and that, for example, of the Thames at Teddington.

Table C is prepared for the sake of comparison with Tables A and B. The drainage area to which it relates is 18,000 acres and discharges into the River Vyrnwy in North Wales. It does not differ widely in extent from many of those on the Thames tributaries, in Tables A and B. If the geological formations were the same, a given rainfall would not reach the point of gauging more quickly in the case of the Vyrnwy than in the average of the Thames cases. The Vyrnwy drainage area consists chiefly of the clay, slates, shales, and grits of the Upper and Lower Silurian formations. The yield of this district in relation to summer rainfall is not exceptional. It is about the same as is generally found in districts suitable for the construction and working of impounding reservoirs, and has only been chosen for the present comparison because it is in this respect a normal area, and because it is the only area of dimensions approximately similar to the areas on the Thames tributaries under consideration which Mr. Deacon has continuously gauged for a sufficient number of years to afford the necessary examples of approximately equivalent rainfall over similar periods.

A glance is sufficient to show that, with the exception of the Windrush, the discharges from springs and summer rainfall on the Thames tributaries, upon which reservoirs have been suggested, are all very much smaller than those of a normal district such as the Vyrnwy. At the time of gauging, the discharge of the Sherborne Brook was less than the one-hundred-and-fiftieth; the discharges of the Rivers Glyme and Dorne and the Sor Brook were from one-half to one-third; the discharges of the River Swere and the Nether Worton river were from one-sixth to one-ninth; that of the Cherwell streams from one-ninth to one-twelfth; and that of the River Thame from one-sixteenth to one-twenty-fifth of the discharge which would have resulted from the same rainfall per unit of area in a normal district.

The Windrush gave a discharge of 62 per cent. of one cubic foot per second per 1,000 acres, which, though small for the rainfall, was about twice as great per unit of area as in any of the other eight cases. The area to the point of gauging, viz., the south-west corner of Barrington Park, is 59,390 acres, or more than double any of the others. The river at this point flows over the Upper Lias Clay, and while traversing the Lower Lias Clay above, and the Marlstone between that and the Lower Lias Clay, it receives the springs from the jointed Marlstone, the Midford Sand, and from some Oolites.

* For reports of previous sittings of the Commission, see last volume of the *Builder*, pp. 418, 435, 456, 480, 503; and current volume, pp. 10, 29, 47, 71, 82, 103, 126, 298, 316, 332, 353, 375, 396, 438.

During the four weeks preceding the various Thames gaugings in Tables A and B, the rainfall, as also recorded in those Tables, was from 1·53 in. in the case of the River Churn at Baunton, to 2·53 in. in the case of the River Glyme, but, omitting the Windrush, the resultant discharges given in percentages of a cubic foot per second per 1,000 acres were only:

From the Glyme	32	per cent.
,, Dorne	30	,,
,, Sor Brook	23	,,
,, Swere and Nether Worton rivers, under	12	,,
,, river Cherwell and its tributary, about ...	7	,,
and ,, Sherborne stream, under	½	,,

It is shown by Table C that a corresponding normal area after corresponding rainfall will discharge from 80 to 150 per cent.

And will very rarely (after a corresponding rainfall) fall to ... 43 or 52 per cent.

In gauging various normal streams in the very dry years of 1878, 1884, and 1887, the lowest results obtained from areas exceeding 1,000 acres were as follows:—

The discharge of the river Vyrnwy (18,000 acres) fell, on August 3, 1878, to	21	per cent.
On June 27, 1884, to	24	,,
And on July 23, 1887, to	22	,,
The discharge from the river Cowny (North Wales), 2,669 acres, fell, on June 20, 1884, to	28	,,
The discharge from the river Marchnant (North Wales), 1,561 acres, fell, on June 23, 1884, to...	24	,,

Gaugings on other normal streams in different parts of the country, having drainage areas exceeding 1,000 acres each, have given discharges towards the ends of long droughts varying from 28 per cent. to 33 per cent. of one cubic foot per second per 1,000 acres; and on an area of only 761 acres on the clay slate of the Lower Silurian rocks, after a rainfall during the previous four weeks of ·23 in., Mr. Deacon found the stream to be discharging only ·17 of a cubic foot per second per 1,000 acres.

The gaugings of the Thames tributaries, with one exception, began on the 1st and ended on the 12th July, 1892. The mean discharge at Teddington, including water pumped by the London Companies, was, towards the end of that period, about 35 per cent. of a cubic foot per second per 1,000 acres, which may be taken to be the discharge per unit of area of the 2,353,000 acres of the Thames basin corresponding with the discharges of the upper tributaries given in Tables A and B. For a corresponding rainfall on the Severn basin of 1,256,000 acres above Worcester, the discharge would not be less than 55, and would probably exceed 60 per cent. of a cubic foot per second per 1,000 acres.

The rainfall of three consecutive dry years in this country occasionally falls to about 78 per cent. of the mean, and the rainfall of a single year falls below 67 per cent. of the mean. On such areas as those of the Upper Thames tributaries, it is exceedingly difficult to predict the proportion of this reduced rainfall that will enter a reservoir.

If from the main rainfall of 27 in.,—which is probably correct,—we deduct one-fifth, the net result, which will exceed the mean discharge of three dry years, is only 21·6, almost identical with 21·62 in., the rainfall over the whole Thames basin in the dry period from July 1, 1890, to June 30, 1891. The loss in that period as shown by the difference between the rainfall and the Teddington gaugings added to the water abstracted by the London Companies, was 17·22 in., and if the loss proved to be as much as this upon the Thame area, the available rain for a reservoir capable of equalising the flow of three dry years would be under 4½ in. The other areas proposed are so abnormal that without continuous gaugings it is impossible,—even assuming the reservoirs to be watertight,—to assign to each the amount of inevitable loss in dry seasons. The Thame and Windrush reservoirs might probably, without much difficulty, be made watertight, but it is exceedingly doubtful whether, by any such works as have been suggested, or are desirable, the remaining sites could be rendered watertight. Under such circumstances, if Mr. Deacon were called upon to assign to the suggested reservoirs a probable minimum annual yield, it would be considerably less than that given in the statements submitted to the Commission on behalf of the Conservators. If it is thought worth while to consider this matter further, the proper course is to gauge the streams at the points of proposed interception, and this should be done with automatic recorders. It is not necessary that these gaugings should extend over any exceptionally dry years, as the ratio of the mean annual rainfalls is already determined sufficiently by Mr. Symons' gauges; but the proportion lost has not yet been determined for any such areas as those of the tributaries of the Upper Thames.

Flow of the River Thames.

Mr. A. R. Binnie, the Chief Engineer to the London County Council, submitted a voluminous statement and elaborate tables on this subject. In his introduction he said:—

"In consequence of certain returns of the daily flow of the river at Teddington Weir and other information having recently been made public, it has become possible for the first time to arrive at some general and accurate conclusions on the subject in a way which hitherto has been impracticable.

The Thames, in many respects, differs from most of the other large rivers of the United Kingdom, among the principal of which are the gentle slopes of its valley which up to the line of watershed are thickly inhabited and cultivated in all directions, and the fact that the streams which feed it in nearly all cases take their rise among the porous strata of the chalk and oolites.

There has arisen an impression that the flow of the river is more uniform than in other cases, on account of the autumn and winter rain being stored up in what some persons call 'vast underground reservoirs,' in other words, in the fissures and pores of the permeable rocks among which it takes its rise.

Consequently, it has been assumed that a much larger proportion of the total rainfall is discharged than is found to be the case in other rivers and also that the capacity of impounding reservoirs, if constructed, need not be so great to utilise and equalise the varying flow of the river.

No doubt, owing to the fact that the river has been rendered navigable by the construction of locks and weirs cutting its length up into long stretches or pools of permanently level water, the actual facts of the case have been to a certain extent veiled from immediate and *primâ facie* observation; although in the extremely dry and waterless condition to which the large areas of the Oolitic plateaux, in the upper valley, and the chalk downs are reduced in summer, and in the winter floods of the river at and about Oxford, which receives its flow principally from the Oolites and chalk, we have had indications that those strata are not quite so porous, and do not retain the rainfall which they do absorb for so long a period as some persons would at first sight imagine.

The facts which have within the last few months become available for the purpose of studying this question are the following:—

1. The daily flow of the Thames at Teddington Weir, from January 1, 1883, to December 31, 1891, as furnished by the Thames Conservators to the Royal Commissioners on June 14, 1892.

2. The average quantity of water per day and per month abstracted by the five companies from the River Thames at Hampton, Molesley, &c., above Teddington during the same period, as derived from the Water Examiner's Returns.

3. The monthly and annual average rainfall of the Thames Valley, furnished to the Council by Mr. G. J. Symons, F.R.S., during the same period.

4. The average sunshine, temperature, and humidity of the air, as derived from the Observatories of Greenwich and Oxford during the same period.

The Thames Conservators have also placed before the Royal Commissioners on July 26, 1892, a diagram comparing the volume of the discharge with the rainfall; but as the discharge on this diagram is given in million gallons, and the rainfall in inches, it does not lend itself very readily to the elucidation of the important subject under enquiry, as there is no immediate and direct mode of comparing inches of rainfall and millions of gallons when plotted to different scales on the same diagram.

The Thames Conservators also, through their Engineer, Mr. J. C. More, placed before the Royal Commissioners on June 14, 1892, a table showing the annual volume of discharge at Teddington Weir, from 1883 to 1891 inclusive, with the addition of the quantities abstracted by the Water Companies. In this table one is at once struck by the fact that in 1889 out of a total average rainfall of 25·64 in., 10·4 in. are said to have been discharged from the ground, whereas in 1836, with a total average rainfall of 31·07, the discharge from the ground is said also to have been 10·5 in. but a reference to the detailed table of the daily flow of the Thames at Teddington Weir put in by the Conservators shows how this arises. Under the head of March, 1889, the total discharge for the month is said to be 167,945 million gallons; this ought to be only 67,945 million gallons; making which correction, the value of the flow from the ground, called 'equivalent rainfall per annum' in the table put in by Mr. C. J. More, for 1889, should read 8·57, and not 10·4 in."

Mr. Binnie proceeded to analyse the various figures relating to this subject, and he worked them into a series of ten tables, which embody the facts of the case for the nine years from 1883 to 1891 inclusive.

Sketch for Panel in Wood or Metal Work. By Miss E. M. Rope.

SKETCH FOR A DECORATIVE PANEL.

THIS is a sketch by Miss E. M. Rope for a panel to be executed either in wood or metal for a chimney-piece or other similar position.

BENNETT'S HYDRAULIC SELF-CLEANSING STREET GULLY.

ON the next page we give an illustration of a system for cleaning street gullies of detritus, invented by Mr. W. B. G. Bennett, C.E., Borough Engineer of Southampton. The *modus operandi* is as follows:—When the mud-cart arrives at the point where the gully is fixed, the man turns back the grate and opens the water-tap, placed in an ordinary covered box in the foot-walk, which admits the water to a plunger below, when the mud-container rises automatically and tips its contents into the cart, which operation being completed, the water-tap is reversed, and the dirt-container retires to its place, the exhaust water doing duty a second time in cleansing the gully-pit. A provision is also made to flush out the container with clean water.

At Southampton one of these gullies is operated by compressed air. In that town, three miles of air main are laid in the streets in connexion with the Shone system of sewage, from which service connexions can easily be laid on, the waste heat from the combustion of the house refuse in a destructor being utilised as the motor required for compressing the air.

By this arrangement the *frequent* emptying

of the gullies, often much neglected, is much facilitated.

In a general system of drainage, any number of gullies can be connected to the hydraulic gully, and the combined contents discharged at one operation; in this case the container is made of larger dimensions, with special tipping gear. The same apparatus can also be worked pneumatically.

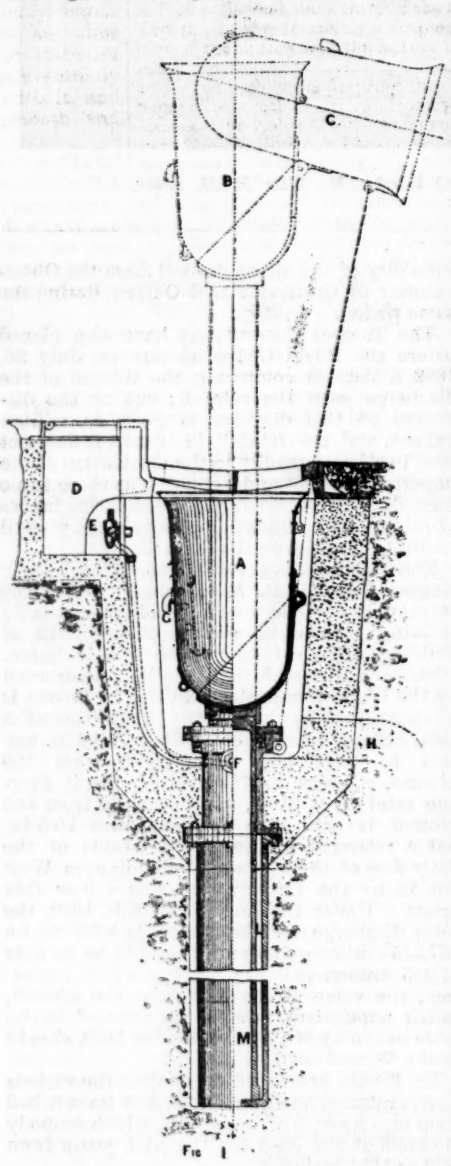


Fig 1

SECTION

Bennett's Hydraulic Self-Cleansing Street Gully.

REFERENCES.

Fig. 1 is a sectional elevation, showing the apparatus arranged as an ordinary single street-gully.

A is the container under grating in channel of carriageway.

B is the container raised to tipping level.

C container tipped and discharging.

D box in footpath, with hinged cover containing cock E, by which the supply of water to the cylinder, L, and the exhaust from plunger is regulated by a hand key from the foot-walk.

F ferula for connecting supply and exhaust pipe.

G nozzle for attaching flexible tubing to cock E for cleansing container.

H trapped outlet from gully-pit to drain.

I tipping line.

SOCIETY OF ENGINEERS. — The thirty-eighth annual general meeting of this Society was held on Monday last, at the rooms of the Society, 17, Victoria-street, Westminster, S.W. The chair was occupied by Mr. Joseph William Wilson, jun., President. The following gentlemen were duly elected by ballot, as the Council and Officers for 1893, viz.:—As President, Mr. William Andrew McIntosh Valon; as Vice-Presidents, Messrs. George Abraham Goodwin, Henry Faija, and William George Pierce; as Ordinary Members of Council, Messrs. R. W. Peregrine Birch, Chas. Claude Carpenter, Samuel Herbert Cox, Charles Gandon, Thomas Bell Lightfoot, Perry Fairfax Nursey, William Bradford, and George Maxwell Lawford; as Hon. Secretary and Treasurer, Mr. Alfred Williams; as joint Honorary Auditors, Messrs. Alfred Lass, F.C.A., and Samuel Wood, F.C.A. The proceedings were terminated by a vote of thanks to the President, Council, and officers for 1892, which was duly acknowledgd by the President. The annual dinner of the Society was held on Wednesday evening last.

ARCHITECTURAL SOCIETIES.

MANCHESTER SOCIETY OF ARCHITECTS.—A general meeting of this Society was held on the 6th inst., at 36, George-street, at which Mr. J. Gibbons Sankey, M.A., was elected a Fellow, and Mr. Bernard H. Brameld an Associate. The third sessional paper was read by Mr. R. Knill Freeman, F.R.I.B.A., entitled "A Few Notes." A great variety of matters important to architects were referred to, including education, practice, competitions, &c., with much useful advice to the junior members. An interesting discussion followed. The annual dinner was held at the Queen's Hotel, the President, Mr. Salomons, in the chair. After the usual loyal toasts, the President of the Royal Institute of British Architects responded for "The Institute."

GLASGOW ARCHITECTURAL ASSOCIATION.—The usual monthly meeting was held last week, the President in the chair. A paper was read by Mr. A. N. Paterson, M.A., A.R.I.B.A., on "Colour as a Means of Architectural Expression."

ARCHITECTURAL SECTION OF THE GLASGOW PHILOSOPHICAL SOCIETY.—A meeting of the Architectural Section of the Glasgow Philosophical Society was held on the 12th inst., Mr. Campbell Douglas, F.R.I.B.A., President, in the chair, at which Mr. J. Lindsay Miller, secretary of the section, gave a paper entitled "Notes on our Cathedral," dealing with the subject historically and architecturally.

THE LONDON COUNTY COUNCIL.

A SPECIAL meeting of this Council was held on Friday, the 9th inst., the Chairman, Mr. John Hutton, presiding.

Premature Publication of Reports. — The Chairman referred to the growing frequency with which reports and conclusions of committees are prematurely published in the daily and provincial journals before they are formally before the Council. As he had ascertained that these reports had not been communicated to the journals in question by the office staff, he could only come to the conclusion that they must be communicated by members. He trusted that there would not be any repetition of such a breach of confidence on the part of members.

Legislation for next Session.—The remainder of the special sitting was chiefly occupied by the consideration of clauses of Bills to be promoted by the Council in the next session of Parliament.

The usual weekly meeting of the Council was held on Tuesday last, the Chairman, Mr. John Hutton, presiding.

Report of the Fair Wages Committee. — The following report of the Fair Wages Committee as to payment of trade union rate of wages, form of contract, &c., was presented:—

"On May 27, 1892, the Council referred to us the following resolution, passed on the motion of Mr. John Burns, M.P., and the amendment of Sir Thomas Farrer:—

'That all contractors be compelled to sign a declaration that they pay the trades union rate of wages and observe the hours of labour and conditions recognised by the trades unions in the place or places where the contract is executed, and that the hours and wages be inserted in and form part of the contract by way of schedule, and that penalties be enforced for any breach of agreement.'

The Council also referred the following proposals by Mr. Stockbridge:—

'1. Should any workmen in the employment of the contractor be not paid the schedule wages, then the Council shall be at liberty to deduct from the money payable to the contractor under the contract a sum equal to double the amount of such deficiency, and the Council shall be at liberty out of such sums so deducted to pay the contractor's workmen any deficiency in their proper wage for the whole of the past term of the contract.

2. The contractor shall undertake to keep proper time-books and wages-books in connexion with the contract work, and such books shall at all times be open to the inspection of such person or persons as may be appointed by the Council for this purpose, and the contractor shall, under a penalty, be bound to make and deliver to the Council whenever required a declaration that the hours and wages set out in the time and wages books are correct, and that he has paid the several sums charged therein.'

And also the following proposal by Mr. Leon—

'But London rates of wages shall be paid by every contractor to all workmen employed on any London County Council work within twenty miles of London.'

We have proceeded upon those resolutions at considerable length, and have endeavoured to ascertain from other public bodies how far they have proceeded in this direction. We have been unable to gain much, or indeed any, guidance from their proceedings, with the exception, perhaps, of some of the Government Departments, which have at least to some extent adopted the system of scheduling rates of wages.

As the result of our deliberations, we have come to the conclusion that the best way in which the original resolution of the Council can be carried into effect is by the Council adopting the proposed standing orders appended hereto. It will be seen from these standing orders that we do not at present see our way to carry the resolution of the Council into effect with reference to contracts for clothing, owing to the absence of unanimity amongst the trade unions concerned. . . .

It will be seen from the perusal of the proposed standing orders that we are of opinion that the resolution of May 27 should be extended, so that the principle shall apply to all work carried out by the Council under its recent regulations with respect to works to be executed without the intervention of a contractor. It is thought by the Committee that if the Council requires contractors to pay and observe the rates of wages and conditions of labour recognised by trades unions, it can hardly with justice object to be bound by a similar regulation.

It will also be seen that the proposed standing orders provide for the making and keeping of a wages and hours of labour log at the County Hall, and that this log shall be open at all times to public inspection. We have been unable to obtain sufficient information to enable us to compile a complete log for submission to the Council, and suggest that this task should be continued by the Works Committee, which, if the recommendation of this Committee is adopted, will be immediately concerned in the matter.

It will be seen from the proposed standing orders and the form of contract therein that we have adopted the second proposal by Mr. Stockbridge. After careful consideration, we have not thought it desirable to recommend the Council to adopt the first proposal, as we think that this proposal would be somewhat difficult to apply, and might be construed to suggest what we think is not the fact,—that the Council has no direct or legitimate interest in the payment of good wages. We think that the Council is directly interested in the payment of good wages and the observance of proper conditions of labour for the purpose of securing good and substantial work.

With regard to Mr. Leon's proposal, we think that it should be adopted, and have inserted words in the proposed standing orders which we believe will carry it into effect.

It will be seen from the proposed standing orders that we have not thought it within the scope of our reference to prohibit overtime altogether, but the proposed clause only permits overtime where it is strictly in accordance with the rules of the trade union concerned.

The question of sub-contracting has engaged our attention on several occasions, and ultimately we have come to the conclusion that, although in any case of sub-contracting the stipulations and penalties with regard to rates of wages and hours of labour in the original contract should apply, it is not desirable that these stipulations should be set out in detail in the original contract. We have therefore come to the conclusion that the clause at present inserted in contracts for the purpose of preventing sub-contracting should be inserted in future in the manner set out in the proposed standing orders, and that, in the event of permission to sub-contract being applied for, such permission should only be given upon the contractor undertaking in the terms of the proposed standing order, No. 6.

In order to show how stringently other public bodies have dealt with sub-contracting,—no doubt with a view to its prevention,—we may mention that the Corporation of Nottingham has adopted the following clause:—'That every contractor who does not propose to carry out every part of the work himself, shall, with his tender, supply the name of every contractor he intends to employ.' We have not, however, thought it necessary to go so far as this.

We are advised and believe that the penalties and stipulations we have inserted in the proposed form of contract would have full legal force and effect. We therefore recommend—

'That for the purpose of carrying into effect the before-mentioned resolution of the Council of the 27th May, 1892, the following standing orders be adopted by the Council—

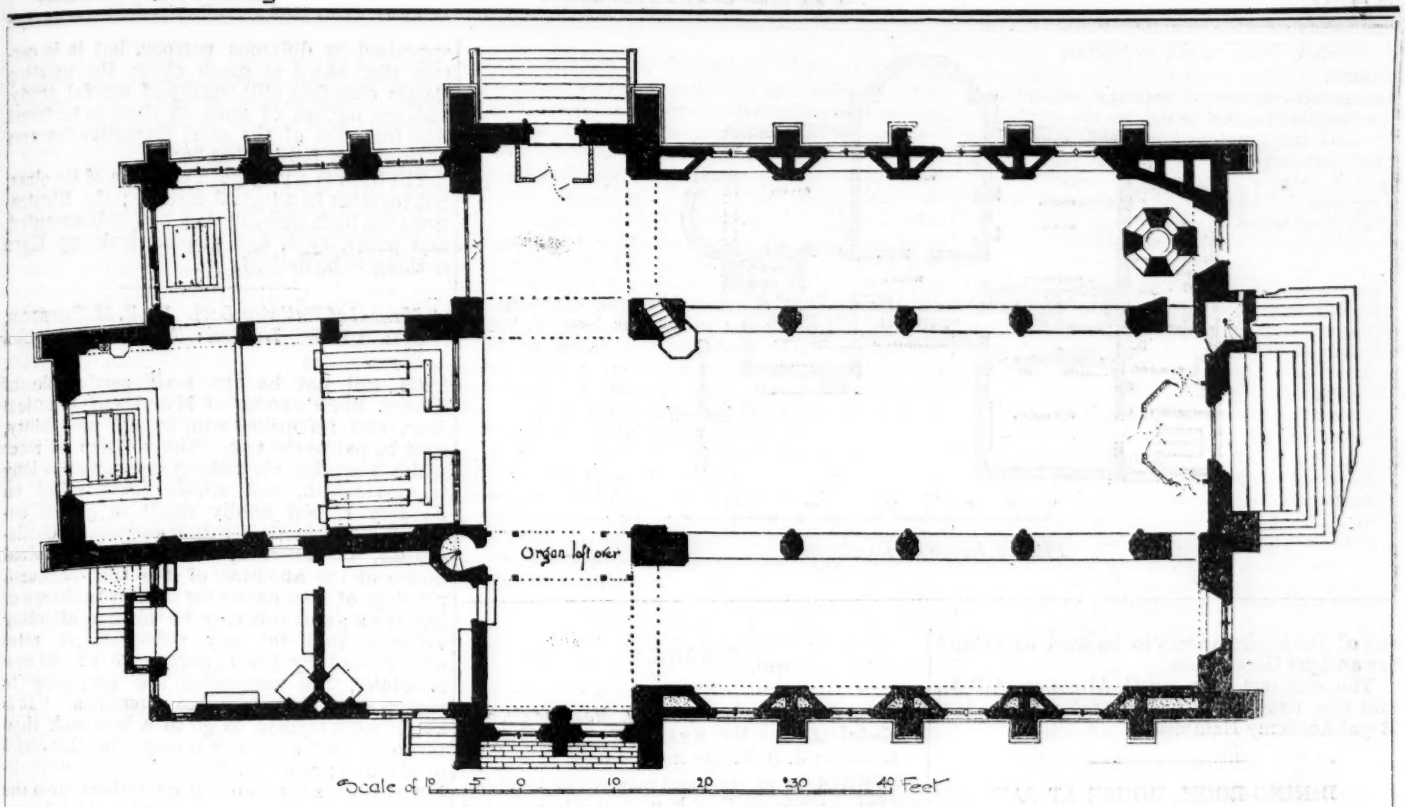
FAIR WAGES CLAUSE.

Suggested Standing Orders as to Contracts, except Contracts for Clothing.

1. There shall be kept, at the County Hall, a list of the rates of wages and the hours of labour to be paid and observed by the Council in works which are in the nature of construction or manufacture, and which the Council may resolve to carry out without the intervention of a contractor.

The list shall be settled by the Council on the recommendation of the Works and Stores Committee, and shall be based on the rates of wages and hours of labour recognised by the various trade unions in London, and shall form part of the standing orders of the Council.

The list shall at all times be open to public inspection.



Competition Design for St. Luke's Church, Winnington: Plan.

2. In inviting tenders for work to be executed within twenty miles of Charing-cross, the advertisements and instructions for tender shall state that in the case of all workmen to be employed by the contractor he will be required to pay wages at rates not less, and to observe hours of labour not greater, than the rates and hours set out in the Council's list, and that such rates of wages and hours of labour will be inserted in a schedule, and will form part of the contract, and penalties shall be enforced for any breach thereof.

3. When the contractor in connexion with the works contracted for intends to employ labour at a greater distance than twenty miles from Charing-cross, he shall be required, in addition to the above, to insert in the said schedule the names of the various classes of labour which he intends to employ, together with the places where such labour will be employed, and the rates of wages and hours of labour to be paid and observed in respect to each class of labour, and no tender shall be accepted unless the rates of wages and hours of labour inserted in such schedule be proved to be the rates and hours recognised at the date of the tender by the trades unions of the district where the work is to be done, and such schedule will be added to and will form part of the contract, and penalties shall be enforced for any breach thereof.

4. In all contracts for the supply of any raw material or manufactured articles, other than clothing, a condition shall be inserted that with respect to all materials or articles produced or manufactured by the contractor, the contractor will, in the production or manufacture thereof, pay and observe the following rates of wages and hours of labour, viz.:—

(*a*) Where the production or manufacture thereof is carried on within twenty miles of Charing-cross, the rates of wages and hours of labour appearing in the Council's list.

(*b*) Where the production or manufacture thereof is carried on at a greater distance than twenty miles from Charing-cross, the rates of wages and hours of labour recognised by the trade unions of the district where it is carried on.

Provided that this standing order shall not apply to the supply of articles not manufactured by the contractor.

5. All instructions for tender and contracts under these standing orders shall be respectively, as far as possible, in the following forms."

[Here follow the forms of "instructions for tender," forms of contract, schedule, &c., for which we have no space this week, although we hope to give them in a future issue.]

Sir Thomas Farrer moved an amendment providing that the proposed first standing order should so read that the list of the rates of wages and hours of labour to be paid and observed by the Council should be applied and enforced in those cases, and in those cases only, in which there was a trade union of which the rates of wages and rules were recognised and generally observed in the trade. He thought that it was quite possible that the steps the Labour Party were taking, instead of relieving pauperism, would add to it, and make the lot of the sweated harder than it was. If the report was adopted they would have to surrender all their powers and responsibilities into the hands of their own *employés*, and this would be disgraceful. He appealed to the Council, as they valued their own dignity and the future welfare of London, not to give themselves, bound hand and foot, over to any trade union whatever.

Mr. F. Debenham seconded the amendment, which he said was to limit the action of the Council in matters of contract to the payment of fair wages.

Mr. Burns, M.P., objected to the amendment as vague and indefinite. The recommendations of the Committee embodied a practical, operative, and automatic schedule of wages, representing what masters and men had come to by common agreement.

After some further discussion, the amendment was rejected, on a division, by 62 votes to 46.

Lord Monkswell then moved another amendment:—"That after the second word 'labour,' in Clause 1, the word 'generally' be inserted, and after the word 'recognised' the words 'and enforced' be inserted."

Mr. Orsman seconded the amendment, which, however, was defeated by 53 votes to 52.

Mr. Frederic Harrison next moved to insert after the word "recognised" the words "and in practice obtained."

This amendment was carried by 73 votes to 29, and the further consideration of the report was postponed to a special meeting to be held this Friday, December 16.

Proposed Statue of Dickens.—On the recommendation of the Parks and Open Spaces Committee, the Council declined to accept a bronze statue of Charles Dickens, offered as a gift by Mr. Elwell, an American sculptor, on the ground that the author had left on record a strong desire that no statue of him should be erected.

The Public Health and Housing Committee recommended that clauses should be incorporated in the General Powers Bill to give the Council powers to deal with provisions to meet an outbreak of cholera should it occur. This was agreed to, after some discussion.

The Council subsequently adjourned.

ARCHITECTURAL PARTNERSHIP.—We learn that Mr. F. E. F. Bailey, A.R.I.B.A., Bridge-street, Walsall, and Mr. H. H. McConnal, A.R.I.B.A., The Bridge, Walsall, have entered into partnership, and from January 1 prox. will carry on practice as architects and surveyors, at Imperial-buildings, Bridge-street, Walsall, under the style of "Bailey & McConnal."

THE SURVEYORS' INSTITUTION EXAMINATIONS, 1893.—We are informed that 251 candidates have entered their names for the approaching examinations. Of this number 71 are candidates for the Studentship, 133 for the Associateship, and 47 for the Fellowship; representing, in the aggregate, an increase of nearly 25 per cent. on the numbers of any previous year.

Illustrations.

COMPETITION DESIGN FOR ST. LUKE'S, WINNINGTON.

THIS design, made for competition purposes, is based upon the regulation Gothic plan, and worked out in a purely archæological manner. As the nature of the site made it advisable that the main part of the church should lie parallel to the road, the axis of the chancel was deflected to the north in order to give the eastern limb a better orientation.

The drawing was exhibited at this year's Royal Academy Exhibition.

F. C. EDEN AND J. L. WILLIAMS.

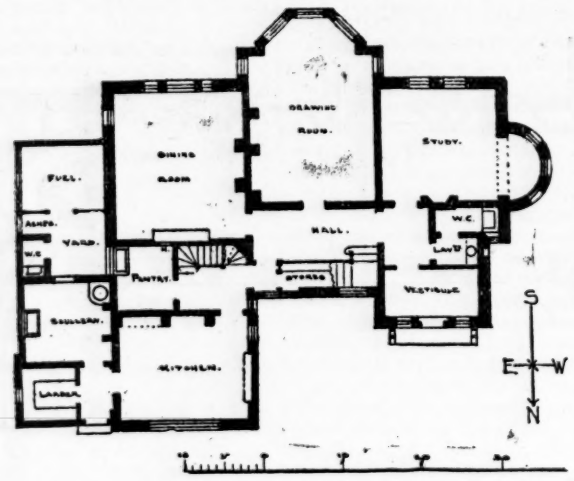
DESIGN FOR A TOWN MANSION.

THIS design, like the one by Mr. Bartlett published in the *Builder* of November 19, was made in competition for the Royal Academy Gold Medal, which in this instance at least has elicited some good designs. In this one the cornice, and the rich decoration over the principal windows, contrast well with the plain treatment of the remainder of the walls, and the manner in which the balustrade of the porch is connected with that of the balconies is a good point, connecting the porch with the house and with the range of windows of the principal rooms. The whole is a dignified elevation, such as would take its place well in such a street as Pall Mall, for example.

The design is by Mr. Herbert Baker, and was exhibited at the last Royal Academy Exhibition. We are unable to give a plan or any further details as to the design, owing to the absence of the author from England at present.

THE INTERIOR OF A LONDON LIBRARY.

THE library of which the interior is shown was a small one in a London house, whose sole light was got by a bay window at the west end. One side alone was fitted with bookcases; the other side and end were panelled only, as this part of the room was to be hung with engravings. The whole room had to be kept simple and subdued; the woodwork was unpolished walnut, and the upper part was hung with old painted Spanish leather. In the frieze of the bookcase oval pieces of fine marbles were inserted as jewels, and in the frieze of the doorcase there was a flat panel of Rosso antico, with "Libri muti magistri," incised and gilt. The chimney-piece was an old one of statuary marble, inlaid with verde antico, with a looking-glass over it; and the



Plan of House at Eastbourne.

top of the bookcase was to be used as a stand for antique Greek vases.

The architect was Mr. G. Aitchison, A.R.A., and the drawing was exhibited at the last Royal Academy Exhibition.

DINING-ROOM, HOUSE AT SAN SEBASTIAN, SPAIN.

THIS is the interior elevation of the dining-room in the house which forms the summer residence of the Queen Regent of Spain, at San Sebastian. There is a wooden dado and chimney-piece, and a plaster ceiling divided up by tracery into a geometrical pattern; a similar design forms part of the frieze, or rather (apparently) the ceiling design is continued down on to the wall so far. Tapestry is introduced in the upper part of the wall.

Mr. R. Seldon Wornum was the architect, and the drawing was hung at the last Royal Academy Exhibition.

HOUSE AT EASTBOURNE.

THIS house has been lately erected at the junction of Staveley and Buxton roads at Eastbourne. It is heated by Norwegian hot-air stoves, and lighted throughout by electricity. The walls are of red brick, and the roof is covered with Broseley tiles. The contractor for the work was Mr. J. Harding, of Eastbourne. The architect was Mr. Frederick W. Waller, of Gloucester. The house was built for Professor Huxley.

The drawing was exhibited at the Royal Academy this year, but was wrongly described in the catalogue as "House at Sunningdale" by "Messrs. Waller & Son." The correct title is as given on the plate.

LODGE AND GATES TO HOUSE, SAN SEBASTIAN, SPAIN.

THIS forms one of the three entrances to the Queen Regent's residence mentioned above, comprising lodge, guard-room, and gates. The walls are built of Barcelona red brick and local stone dressings, and the roof is covered with Broseley tiles. The constructor was Sr. Benito Olasagasti; and the architect Mr. R. Selden Wornum. The drawing was exhibited at the Royal Academy.

The guard-room occupies the portion under the gable to the right of the drawing; the living-rooms are next the gate. The plan was unfortunately sent to us too late for production.

THE ENGLISH IRON TRADE.—There is little of note to record in the condition of the English iron market. Pig-iron is tolerably steady, although transactions do not exhibit any increase. Finished iron manifests no improvement, and there is little or no change in the tin-plate branch. In steel a few more orders have been placed for plates on shipbuilding account, and prices show a corresponding amelioration. Shipbuilders are apparently a trifle better placed for work than recently, and engineers and ironfounders report a slight change for the better. The coal trade is moderate. The chief event of the week in this department is the decision of the South Wales miners to join the Federation of Great Britain.—*Iron*.

Books.

Cairo. Sketches of its History, Monuments, and Social Life. By STANLEY LANE-POOLE. London: J. S. Virtue & Co. 1892.

THIS is in size and method of handling a "popular" book, professedly intended as a guide for the ordinary tourist on a pleasure visit to Egypt; and, considering the wealth of material obliged to be compressed into a very moderate compass, the devotion of much space to matters purely architectural could not be expected. But although the buildings of Cairo occupy a comparatively small portion of the book, it is evidently from a consideration of the balance of subjects required by the average reader, and not from any lack of adequate knowledge on the part of the author.

The buildings most worthy of attention are the mosques, of which over three hundred still remain, many of them ranking among the loveliest architectural creations in the world, second only, as we may claim, to some of the Christian churches of the same period; but, at any rate, as Mr. Lane-Poole says, "the noblest examples of Saracenic architecture that can be seen in all the wide empire of Islâm." All the principal mosques, some of the most beautiful of which were built as tombs, are well described, and their general appearance and most striking details illustrated; and though no attempt is made to analyse their variations of style, their constructive principles, or the elements of their beauty, enough is told about them to give the general reader a fair idea of their character, and to make the lover of art look forward with anticipation to the larger book which Mr. Lane-Poole is preparing. In the chapter on "The Museum of Arab Art" (in connexion with which it may be noted, for the use of those scrupulous about nomenclature, that the author gives his reasons at length for preferring "Saracenic" as the best general designation for all the styles of architecture variously known as "Arabian," "Mohammedan," "Moorish," or "Saracenic"), there is much valuable information about decoration and furniture, both religious and domestic, and it is pleasant to learn how fine a collection is now, only just in time, being secured of these fast perishing relics of the great period of Cairene history.

Another chapter of peculiar interest is that headed "Christian Babylon," an account of the Copts and their churches at Babylon by Old Cairo. It may be new to many that, through this now despised and little-known race, we may trace a connexion between our own religious customs and art and those of ancient Egypt. "Irish Christianity," we are told, "the great civilising agent of the early Middle Ages among the northern nations, was the child of the Egyptian Church;" and as, on the one hand, the work of the Irish monks of the ninth and tenth centuries has left abiding traces among all the nations of North-Western Europe, so, on the other, the Egyptian,—now called the Coptic,—Church has been always, and is at the present day, composed of "true survivors of the people whom Pharaoh ruled, and who built the pyramids of Giza." The exact value of this clue in elucidating our own ecclesiastical antiquities may be variously appraised by different persons, but it is certain that there is much about the existing Coptic churches still worthy of careful study, and the notices of some of them to be found here form one of the most attractive features of this really fascinating book.

The book is a very good example of its class, put together in a logical manner; the illustrations are both well-selected and well-executed, and paper, type, and general make-up leave nothing to be desired.

A Manual of Railway Law. By F. M. PRESTON, B.A., LL.B. London: Adam and Charles Black.

THIS will not be the least serviceable of Messrs. Black's series of Manuals of Practical Law, and its utility will, in all probability, soon be put to the test. The revision of rates which has taken the railway companies so long to accomplish, and which takes effect on January 1, will hardly result in giving unqualified satisfaction to their customers. Cattle-dealers, for instance, have already received notice of the abolition of the time-honoured privilege of free passes for drovers in charge of live-stock; and this may be taken as affording evidence that for any reductions in rates necessitated by the requirements of the new schedules, the companies are preparing to recoup themselves in other directions. "It is better for a layman to go to a law-book than to go to law" stands as a motto for this series of Manuals; and Mr. Preston's work, comprising as it does a number of quotations from the Law Reports, and an appendix in which is embodied many of the charges authorised by the new Acts, will doubtless be found very convenient for reference. A considerable proportion of the recent cases quoted have been commented upon in our columns. Many decisions which were frequently quoted in actions tried prior to the passing of the Act of 1888, turned upon disputed points which have been dealt with in that measure, and, consequently, they will have but little bearing upon cases arising under the dispensation commencing with the appointment of the present Railway Commission. Many questions, however, may yet arise for which parallels will be found among Mr. Preston's examples, and the arguments and rulings in the cases set forth may afford precedents tending to the avoidance of useless litigation.

The introductory chapter may be described as historical, and is followed by detailed particulars of the course pursued in the promotion of a railway company, the acquisition of land, and the construction of the railway, as regards legal formalities and Parliamentary powers. In this connexion much information is given concerning the obligations imposed upon railway companies with regard to the disposition of superfluous lands, which is interesting and instructive; while the question of compensation for lands acquired is also considered. The remaining chapters deal with the rights, powers, duties, and obligations of the companies, both as carriers of goods and passengers, and as regards the general public. It is noticeable that the word "traffic," as defined in the Railway and Canal Traffic Act of 1854, includes passengers; and that the section which provides that railway companies "shall afford reasonable facilities for the receiving, forwarding, and delivering of traffic," applies to passengers as well as goods.

The language employed throughout the book is very free from legal technicalities, although terms are occasionally met with which will remind the reader that they have other significations than those ordinarily associated with them; as, for instance, when it is stated that among those who may vote in person or by proxy at shareholders' meetings are "committees of lunatics or idiots."

Histoire de la Sculpture Grecque. Par MAXIME COLLIGNON, ancien membre de l'École Française d'Athènes, &c., &c. Tome premier. Les origines, les primitifs, l'archaisme avancé, l'époque des grands maîtres du cinquième siècle. Ouvrage illustré de 11 planches hors texte en chromo-lithographie ou en héliogravure et de 278 gravures dans le text. Paris: Libraire de Firmin Didot et Cie., Rue Jacob, 56. 1892.

M. COLLIGNON is well known already to English students of Greek art by his two manuals on Greek archæology and mythology, which long ago appeared in English form. Those,

and they are many, who have profited by these elementary books will be glad to follow the author's further lead. The sumptuous volume before us was much wanted. It covers nearly the same ground as Mr. Murray's history of Greek sculpture; but Mr. Murray's second edition, which appeared some time ago, though it is excellent, and to every student of the British Museum indispensable, suffers, necessarily, from being a second edition. It is the first edition, with supplementary matter, not, of course, the history of Greek sculpture, re-written, as in some respects it now has to be, by the light of recent discoveries. M. Collignon's book, we predict, will be the standard reference work till it, in its turn, falls out of date, and will largely replace the earlier histories of Mr. Perry and Mr. Mitchell. An excellent example of M. Collignon's lucid and easy way of dealing with a complex and obscure subject is given in his chapter (page 59), "Origine et Date de la Civilisation Mycénienne." We have seen nowhere so good a summary, clear without dogmatism, of this vexed question. M. Collignon passes in review the now obsolete theory of M. Stephani that the Schliemann discoveries at Mycenæ are the relics of barbarian hordes of the third or fourth century A.D., a theory promptly and efficiently disposed of by Prof. Gardner. Next came the Carian theory, started by Dr. Koehler and supported by Messrs. Dümmler and Studniczka. This theory, based largely on the absence of fibulæ in the Acropolis of Mycenæ, fell in its turn when these fibulæ were found in abundance in the lower town. Both theories fell before that which now holds its ground, and which seems to be of always increasing conviction, *i.e.*, that the Mycenæ civilisation is Achæan, Ἀργος Ἀχαικὸν, as Homer has it ("Il.," ix., 141). But the problem is not solved so lightly. This civilisation is one that extended far beyond the Argos of Homer to Attica, to Bœotia, to the islands. The question that next arises is, if Achæan, where was its original *foyer?* Where did this art, made up of elements from Asia Minor, from Egypt, take its rise? Milchœffer said from Crete. That theory held for a time; now we look rather to the mainland; there, at least is the crucible where the diverse elements were fused, as M. Collignon puts it:—"Composite à ses débuts, il est devenu franchement indigène." As to date, the author leaves, as we must leave, the starting-point unfixed, and puts, as most do, the Dorian invasion as the terminus *ante quem;* but he warns us that the breach was no sudden one. As M. Reinach has well put it:—"L'invasion dorienne est pour la Grèce comme le début d'un long moyen âge qui efface les traces d'une culture déjà florissant." We reserve further comment on an admirable book till the issue of the second volume, to which the Parthenon marbles are deferred. It is noticeable that Pheidias is treated apart from these marbles. Evidently M. Collignon shares the now common conviction that his relation to the decorative marbles is much slighter than was formerly supposed. How impossible it is to keep up to date in archæology is shown by the absence, already felt, of the new Selinus metopes, and the Argive head of Hera.

Gas-works, their Construction and Arrangement, and the Manufacture and Distribution of Coal-gas. Originally written by Samuel Hughes, C.E. Rewritten and enlarged by William Richards, C.E. Eighth edition. London: Crosby Lockwood & Son. 1892.

This treatise deals comprehensively with its subject in a popular manner. Commencing with a historical sketch of the invention and development of gas lighting, it consecutively deals with the chemistry and composition of coal-gas, carbonisation, and the general construction of gas-works. The portions of most interest to architects and the general public are the chapters on consumers' meters, burners, and glasses, and the various applications of gas for heating, cooking, and other purposes. Various methods of procuring light, such as water gas, electric light, the lime light, the Gillard light receive notice, and special reference is made to the improvements in gas manufacture and in the construction of gas-holders since the last edition of this book was issued, the principal being the general application of stoking by machinery, automatic manufacture of sulphate of ammonia, the process for the recovery of sulphur from waste gases, and the purification of gas by air or oxygen.

The Construction of Gas-works. Practically described by Walter Ralph Herring, Engineer and Manager, Huddersfield Corporation Gas Department. London: Hazell, Watson, & Viney, Limited. 1892.

This consists of a series of articles, which originally appeared in the *Gas and Water Review*, published in book form. A considerable portion is devoted to the construction of gas-works, and the remainder to the manufacture of gas and the appliances involved. The chapters on foundations, concrete, brickwork, timber, and ironwork are full of information as to their application to the construction of gas-works. That on foundations is particularly good, and deals with the treatment of different soils under heavy buildings; and is, therefore, of considerable interest to architects. The chapters relating to the manufacture of gas may be commended to architects who require a general knowledge of the subject. There are numerous illustrations, which are clear and concise, and a considerable portion of the book is devoted to tables of calculations and useful information.

A History of Bosbury in the Diocese and County of Hereford. By the Rev. Samuel Bentley, M.A. J. Masters & Co.

No district in England is more rich in what may be called "village-towns" than the western-midland district. In Herefordshire especially, where neither manufacturers nor mines interfere with agricultural pursuits, they abound. They show no signs of growth, and but few of decay. They remain in much the same state as they were a century ago. A church of more than common beauty, a main street, picturesque with its half-timbered houses and quaint gables, the mansion of the squire, with, perhaps, some conventual buildings and an old Grammar School,—these are the common features of the Herefordshire villages, which have never grown into towns. Bosbury, which lies about four miles from the interesting old town of Ledbury, is a good example of this sort of parish, and has been fortunate in having in its present vicar a careful and painstaking historian, and he, too, must be congratulated upon having secured for his collections such excellent printing and binding. It is a pleasure to read the annals of a parish out of a volume so tastefully got up. The church is, of course, the chief object of interest in Bosbury. It dates back to the close of the twelfth century, but its most noteworthy features belong to a later period. They include an exceedingly beautiful Perpendicular rood-screen, rich in wood carving; a chantry chapel, built by Sir Rowland Morton about the year 1530, and some Renaissance monuments attributed to John Guldo. The tower of the church stands about 60 ft. from the main building, and like other detached towers in the same county, was probably used for defensive purposes. The lordship of the Manor of Bosbury vested in the Bishop of Hereford, who had a palace there, of which some scanty remains still exist, but, except in connexion with Bishop Swinfield, they are of less interest than the old house at Harford, now the Crown Inn. Some traces may be seen of a Preceptory of Knights Templar,—still known as Temple Court,—and there is a Grammar School, with the usual history of scandalous mismanagement succeeded by root-and-branch reform at the hands of the Charity Commissioners. Altogether Bosbury presents a good deal for the delectation of the antiquary and the artist, while for those in search of absolute repose, in the midst of rural surroundings, it might even be recommended as a place of residence.

Handbook of House Property and Fine Art. By E. L. Tarbuck, Architect and Surveyor. Fifth edition, enlarged. London: Crosby Lockwood & Son. 1892.

This book was originally published simply as a Handbook of House Property, and as such it was a useful little work. Unfortunately, possessed by some *cacoethes scribendi*, the author amplified it by an addition on fine art. The mixture is a bad one, and the usefulness of the book has been considerably diminished. The practical part has in this edition been kept up to date; thus, the provisions of the Tithes Act, 1891, are noted. But the space which is taken up by the pages on fine art had much better have been given to some amplification of the practical parts of the book. For example, an index would be useful, but there is none. When the book reaches another edition, we hope we shall find it in its original form, and with an index in place of the last chapter.

A Table of the Arts and Crafts of the Renaissance. By C. R. Ashbee, M.A. Guild and School of Handicraft, Essex House, London. 1892.

This is a very useful table. It is printed on a large sheet of strong paper, and groups in parallel vertical columns various classes of work, commencing from the left hand with "Historical cycles, Patrons, and Personalities," "Historical Events Bearing on Development of the Arts," "Events in English History," and then going on to "Architecture," "Sculpture and Carving," "Metal Work," &c. &c. Horizontally the events of about the same date stand on the same line, so that the sheet gives a comprehensive view of the dates of Renaissance Art. We made many years ago a chart of events in architectural history for our own use, on exactly the same scheme, but we do not remember to have seen anything of the kind in print before. It will be most useful in Art Schools; indeed why not in general schools, since we are arriving gradually at the idea that general education should include some knowledge of art?

TRADE CATALOGUES.

Messrs George Smith & Co., of the Sun Foundry, Glasgow, and No. 1, Dowgate-hill, London, send us a large illustrated catalogue of architectural and sanitary ironwork. Its contents are very varied and complete, and it will be found exceedingly useful by architects and builders. In saying this, however, we guard ourselves against expressing approval of all the designs for cast-iron railings, crestings, and gates. The catalogue contains nearly 400 pages and thousands of illustrations, and is well worth attention.

From Messrs. J. G. Statter & Co., of Victoria-street, Westminster, and Millwall, comes an illustrated catalogue of electrical machinery and plant adapted to installations of varied character and requirements. It may be usefully referred to by architects and others who may have to make provision for electric-light installations.

Correspondence.

To the Editor of The Builder.

THE ORIGIN OF THE ART-WORKER'S GUILD.

Sir,—In a brief but sympathetic notice of my article in the *Fortnightly*, on "The English Revival of Decorative Art," the writer is under a curious misapprehension as to the origin of the Art-Workers' Guild. The Guild, as I stated, was the result of the growing desire for more unity among workers in the arts of all kinds, and was quite an independent movement. So was the Arts and Crafts Exhibition Society,—quite a distinct body, be it observed, from the Guild, though sometimes confounded with it.

I hoped I had made it sufficiently clear in the article that while the most part of the painters were bent on trying to reform the Academy, the designers and craftsmen distinctly left them on that issue, desiring to make an independent exhibition.

The idea of *the external unity and co-operation of the arts and crafts is essentially a non-academic idea*, and it is not one which a Royal Academy can adopt or carry out in its true sense *without entirely changing its character.* The Academy is probably fully aware of this, and the instinct of self-preservation is naturally strong.

In the political world, when an institution has done its work it is superseded, and the principle is generally recognised that new wine must be put into new bottles. I venture to think, Sir, the same holds good in matters of art.

Walter Crane.

THE MANSION HOUSE.

Sir,—Your correspondent "E. V.," in his description of this building in the last number (p. 464), writes: "It would be interesting to know the dates of these successive alterations, and the names of the architects under whom they were carried out." Searching among my

notes, the biographies in "The Dictionary of Architecture," and also Wheatley's "London Past and Present," I am able to compile the following statement, which may satisfy your correspondent, and add to his interesting notice:—

The first stone of the edifice was laid October 25, 1739, and it was completed in 1752; designed by George Dance, sen., the Clerk of the Works to the Corporation. The cost in 1748 was put at 42,638*l.* 18s. 8d., including 3,900*l.* for houses pulled down. The total cost, however, is put at 71,000*l.*

The Egyptian Hall is 90 ft. long by 59 ft. wide.

The sculpture in the pediment is by Robert Taylor, who became an eminent architect, and was made a knight.

The Saloon was formed 1795 by covering in the open court, under George Dance, jun., who succeeded his father in the office of Clerk of the Works, as it was then called.

In 1796 he also removed the tall attic at the back over the Egyptian Hall, and formed the present semicircular ceiling to that apartment.

The next entry is in 1836, when the steps up to the portico were altered to each end, in two flights, under Sir Robert Smirke, R.A., architect.

In 1842 the lofty attic in front was removed, and the "Ball-room" ceiling formed, but now used as the Supper-room, under William Mountague, Clerk of the Works to the Corporation.

In 1843 the Hall was repaired, &c., under J. B. Bunning, who had succeeded Mr. Mountague. Cost 1,400*l.*

The Doric portico, or side entrance, was put up under Mr. Bunning, who also formed the new Justice-room in 1849.

In or about 1864, and perhaps earlier, arose grave apprehensions as to the state of the foundations. The edifice had been erected on piling covered by oak planking, the site having a marsh-like character. This having been drained by the new sewerage, the timber necessarily rotted. Concrete was put in under the walls during 1865–6, at an estimated cost of 7,500*l.*, of which about 1,000*l.* was saved. The railings in front of the edifice were removed, whereby land was given up to the public of the value of some 15,000*l.* to 20,000*l.* The Egyptian Hall and Saloon were repaired and redecorated at a cost of about 2,850*l.* In 1867–68 redecorations and reparations were effected at a cost of about 3,000*l.* All these works were done under the direction of Sir Horace Jones, who had succeeded Mr. Bunning.

The steps to the front portico were altered to one flight, as at present, about the end of 1851.

These are, perhaps, the main particulars; but the annual cleanings and reparations are not included. I do not know when the upper portion of the State staircase was removed.

The Lord Mayor, Sir Crisp Gascoyne, was the first inhabitant of this excellent building; he took possession of it 1757–58.

A history of the Mansion-House, describing the sculpture in the Hall and elsewhere, as remarked by "E. V.," would be a very acceptable record. I do not see from the Catalogue that there are any drawings by G. Dance of this building in Sir John Soane's Museum, where there is a large number of his drawings. Will "E. V." call and see for himself?

Wyatt Papworth.

2, *Lupton-street, N.W.*

CHRIST'S HOSPITAL COMPETITION.

Sir,—As I have no intention of engaging in the competition for this large new School, I have the less hesitation in endorsing the suggestion of "Kudos," printed in your last week's issue.

It is of the first importance that this building should mark further progress both in school-planning and in school-architecture.

E. R. Robson.

Kilkenny Waterworks.—The Corporation of the city of Kilkenny, in Ireland, having instructed Mr. W. H. Radford, C.E., to inspect the district, and advise them preliminarily as to the best source for a water supply for the city, he has reported on seven possible sources of supply, finally recommending the Corporation to obtain the water from the mountain streams at John's Well, about six miles from the city. The cost of the works is estimated at 18,000*l.*

The Student's Column.

CONCRETE.—XXV.

CONCRETE FLOORS WITHOUT IRON.

MUCH has been said at different times about the advantages and disadvantages of concrete floors without iron. Architects have been chary of using them because they have had few or no data from which to calculate the thickness required for a given weight and span. Two articles on the subject by Mr. Frank Caws appeared in the *Builder* on July 27 and August 3, 1889, and, after considerable discussion in our "Correspondence" columns, we published a leading article in conclusion. The advantages and disadvantages of concrete floors without iron will be mentioned shortly. Meanwhile, we will consider the strength of such floors, making use of the constants obtained from concrete beams broken by transverse stress, and given in Table XXIII., Chapter XXI.

The strength of a square plate, fixed at the edges and uniformly loaded, may be calculated from the following formula of Grashof's, where w = breaking-weight in cwt. per square foot, L = length of each side in feet, and T = thickness in feet:—

$$w = 4\,C\frac{T^2}{L^2} \times 144 \quad \ldots \quad \ldots \text{(VIII.)}.$$

This formula is extremely simple, and may be put into a still simpler form, which can be more easily remembered. Let W = the total distributed load; that is to say, $w \times L^2$. We then get:

$$w \times L^2 = 4\,C\frac{T^2}{L^2} \times L^2 \times 144,$$

which gives us the simple formula:—

$$W = 4\,C\,T^2 \times 144.$$

In other words, all square plates or slabs of whatever size but of the same thickness, fixed at the edges and uniformly loaded, will carry the same total load. The weight of the slab itself is, of course, part of the load, and consequently as the size of the slab is increased the less does the difference between its weight and the breaking weight become, until ultimately we reach that size of slab the weight of which is more than the actual breaking weight. In such a case, the slab will collapse, by its own weight, as soon as the centres are removed.

The strength of rectangular plates, fixed at the edges and uniformly loaded, may be calculated from the following formula, where B = breadth of slab

$$w = 2\,C\,\frac{L^4 + B^4}{L^4} \times \frac{T^2}{B^2} \times 144 \quad \ldots \quad \ldots \text{(IX.)}$$

Circular plates, of radius R, fixed at the edges and uniformly loaded, may be calculated thus:—

$$w = \frac{3}{2}\,C\frac{T^2}{R^2} \times 144 \ldots \quad \ldots \text{(X.)}$$

Circular plates, supported at the edges and uniformly loaded, require the formula

$$w = \frac{6}{5}\,C\,\frac{T^2}{R^2} \times 144 \ldots \quad \ldots \text{(XI.)}$$

That is to say, the ratio between uniformly-loaded plates *fixed* and similar plates *supported* is as 100 is to 80; the ratio between uniformly-loaded beams, *fixed* and *supported*, has been already stated to be as 100 is to 66. The ratio for rectangular plates will hover between these two, being practically the same for square plates as for circular ones, and approximating more and more to the ratio for beams as the slabs become more and more elongated.

Example:—Find the uniformly-distributed breaking weight at the age of twenty-one days, of a concrete floor having a clear span of 14 ft. 6 in. by 13 ft. 6 in., and a thickness of 6 in., fixed around the edge; the concrete to be composed of 1 part Portland cement and 4 parts broken brick.

The co-efficient of rupture of such concrete is shown by No. 6 in Table XXIII. (see p. 402, *ante*) to be 3·11 at the age of forty-three days. The strength at twenty-one days will be about four-fifths of that at forty-three days, *i.e.*, about 2·5. Proceeding by the help of formula IX. we have

$$w = 2 \times 2{\cdot}5 \times \frac{14{\cdot}5^4 + 13{\cdot}5^4}{14{\cdot}5^4} \times \frac{{\cdot}5^2}{13{\cdot}5^2} \times 144,$$

from which we calculate (most conveniently by logarithms) that $w = 1{\cdot}71$ cwt. Therefore W (the total breaking weight) = 1·71 × 14·5 × 13·5 = 334·7 cwt.

If the weight of the slab itself, which will be about 104·8 cwt. (calculated at 120 lbs. per cub. ft.), be deducted from this, we find that the added load required to break the floor will be 230 cwt. or 11½ tons.

A floor of the dimensions, age, and composition given in this example, but supported at the edges, was actually made and broken by Col. Seddon. It gave way under a distributed load of 10½ tons. If the edges had been fixed, instead of being merely supported, the slab would probably not have broken until a weight of between 13 and 14 tons had been put upon it. This is more than the breaking weight obtained by calculation. But we must remember that great care was taken by Col. Seddon in the construction of the floor; the concrete was well rammed, and was covered with water for seven days after being deposited, in order that the cement might not fail to harden through loss of moisture by absorption, evaporation, &c. We are not told that these precautions were taken by Col. Crozier in the beam from which our constant was calculated.

Very few experiments have been carried out for the purpose of ascertaining the strength of concrete slabs supported or fixed all round. Mr. Potter mentions a balcony having a projection of 4 ft. 0 in. and a thickness of 8 in. at the wall and 3 in. at the free end, which, at the age of eighteen months, bore safely a distributed load of 177 lbs. per sup. ft. The concrete was composed of one part Portland cement to five parts crushed bricks. The test gives a safe-load constant of 1·5, calculated according to formula VII. Mr. C. Drake, in the "R.I.B.A. Transactions 1876," instances a floor "nearly" 20 ft. by 15 ft. by 6 in. (presumably fixed all round), which carried a distributed load of 2 cwt. per sup. ft. without deflection. Assuming the floor to be 20 × 15, it gives, according to formula IX., a safe-load constant of 4·74 if the weight of the concrete itself be taken as part of the load, and of no less than 5·92 if the load of 2 cwt. per sup. ft. be, as is probably the case, in addition to the weight of the concrete. Mr. Drake did not state the composition of the concrete.

It is a pity that many results of tests which have been published are lacking in some important particular,—either the thickness or composition of the concrete is omitted, or the position of the load is not defined, or it is not stated whether the slabs were fixed or only supported.

The only experiments, which are worthy of the name, are those carried out by Colonel Seddon in 1874, and given in Appendix I. of his "Builder's Work and the Building Trades" (1886 edition). The following table gives the results obtained by him on slabs supported all round and uniformly loaded with layers of bricks:—

TABLE XXVI.

Tests of Concrete Floors without Iron, by Col. Seddon.

No.	Length between supports. ft.	Breadth between supports. ft.	Thickness, ft.	Age in days.	Breaking weight, in cwt. per sq. ft.	Weight of slab, in cwt. per sq. ft.	Total breaking weight, in cwt. per sq. ft.	Calculated value of C. for slabs fixed at edges.*
1	14·5	6 75	·5	7	3	·54	3·54	5·66
2	,,	,,	,,	14	2·76	,,	3·30	5·28
3	,,	,,	,,	21	8·88†	,,	9·42	15·07†
4	,,	13·5	,,	,,	1·07	,,	1·61	5·81
5	,,	6·75	,,	14	2·51	,,	3·05	4·88
6	,,	,,	,,	21	2·84	,,	3·38	5·41

* In calculating the value of C, it is assumed that fixing the edges of slab No. 4, which is nearly square, would increase the strength 25 per cent., and of the remaining slabs 33 per cent.

† This cracked under a load of 6½ cwt. per sq. ft., but did not break under the load of 8·88 cwt. per sq. ft., which was the greatest load available for putting upon the slab. Evidently the slab was near its breaking-point; its strength is strangely abnormal. Perhaps the bricks, which must have been piled to the height of 7 ft. or 8 ft., were laid to break joint, and formed a flat arch or dome, which, to some extent, relieved the pressure upon the central portion of the slab.

The first four slabs were composed of one part Portland cement and four parts broken brick (to pass a 1 in. mesh); the concrete was well rammed, and was covered with water for seven days. The last two slabs consisted of one part Portland cement, three-fourths of a part sand, and three parts broken brick. Col. Seddon concludes that the addition of sand seems injurious to the strength of concrete. In calculating the strength at twenty-one days of floors carefully made of Portland cement and brick (1 to 4), the value of C may be taken as 5·5.

Arched Floors. — Experiments have been made by Mr. C. Colson with the object of ascertaining the increase of strength due to an arched form. They seem to show that the strength of concrete arches of small rise (not exceeding, say, one-tenth of the span), and with proper abutments, is approximately equal to the strength of a fixed lintel, the thickness of which is equal to the rise of the arch *plus* the thickness of the concrete at the crown. But the dead weight of the lintel is almost double that of the arch, and therefore the latter will bear considerably more added load than the former. Mr. Colson's experiments were made on arches of the uniform thickness of 9 in., and breadth of 21 in.; some had a clear span of 8 ft. 3 in., and others of 13 ft. 9 in.; the rise of the arch was invariably 9 in.

When arched floors are adopted, they are seldom of the form tested by Mr. Colson, but have usually an arched soffit only, the upper surface being flat. In such cases, the thickness at the crown should never be less than two-thirds the rise. The rise is usually from one-twentieth to one-twelfth the span. Large floors are usually divided into 10 ft. or 12 ft. bays, by means of rolled-iron or steel girders.

Mr. Frank Caws has advocated the use of flat concrete floors with a little cove all round at their bearing on the walls; this gives a slightly domical form to the floor, and increases the strength.

Pro and Con.—The main advantage of concrete floors in large slabs is their cheapness, due to the omission of rolled-iron or steel joists. The chief disadvantage is their liability to give way suddenly and totally under the influence of excessive loads or fires, whereas floors containing iron or steel joists at intervals of 2 ft. or 3 ft. give way gradually and partially. A point in favour of solid concrete floors made of good fire-resisting material, is that the concrete resists fire much better than iron or steel does, and the danger arising from the use of these materials is therefore avoided. Iron thoroughly imbedded in concrete has, however, been found to resist fire admirably.

Floors with Iron, &c.—A few words must suffice about other uses of concrete in floors. The most common method of forming a concrete floor is to fix rolled iron or steel I joists from 4 in. to 6 in. deep, about 2 ft. from centre to centre, and to fill in between them with concrete. The staging under these floors should be kept an inch or more below the bottom of the joists, so that the concrete can pass under these and protect them from fire. Sometimes ⊥ irons are used instead of I joists; theoretically the former are preferable, because they supply just as much as the concrete requires, namely, tensile strength, and no more. The upper flanges of the I joists can well be spared, as the concrete possesses sufficient compressive strength without them. Wire ropes, iron rods and bars, and hoop iron have all been used in concrete floors to give them additional tenacity.

Numberless systems of floors, in which concrete is used, have been patented, such as Measures's, Allen's, Lindsay's, Dawnay's, Homan & Rodgers's, Fawcett's, &c., but as they differ from each other in their ironwork or fire-brick lintels, or other features, rather than in the concrete, we cannot describe them in detail. In Fawcett's system, fire-brick lintels are laid between iron joists, but the concrete plays an important part, as it bears directly on the lower flanges of the joists.

Ceilings.—The ceilings of concrete floors are sometimes formed by a thin skimming coat only, but this is liable to fall off if the floor is subjected to moving loads, as the concrete affords little key for it. Sometimes dovetail blocks or fillets are inserted as described for floors, and wood or wire or "expanded metal" lathing is secured to them, on which the plastering can be executed; this makes good work, not liable to crack or fall. Fibrous plaster slabs are well adapted for fixing under concrete floors.

An excellent method of forming concrete floors which shall have the lower surface perfectly smooth, is that introduced by Mr. Frank Caws. When the wood staging under the proposed floor is in position, it must be covered with a "thin skin of plaster of Paris floated up perfectly level and fair. Upon this . . . . a grout of pure cement and water is thinly spread, and upon this grout the concrete proper is cast, and beaten down in the usual manner. The skin of plaster of Paris is perfectly watertight. Not a drop passes through it, and thus the concrete sets more slowly, and to better purpose; and when the centring is eventually removed, the plaster comes away with it, and leaves the concrete solid ceiling smooth and fair, without a blemish or defect."

Frequently floors are formed in a series of arches of small span (say, from 3 to 6 ft.), and the concrete is deposited on corrugated-iron centres of proper curve, the ends of which are supported by girders. These centres are not removed, but form the ceiling of the room under the floor, and can be painted as desired.

OBITUARY.

JOSEPH FREDERIC DEBACQ.—On November 28 there died, at Ferté-sous-Jouarre, the oldest of the French architects of this day, Joseph Frederic Debacq, born at Paris on May 15, 1800. He was a pupil of Van Cléemputte, of Percier, of Huyot, and of the École des Beaux-Arts, but was known more especially by the voyage which he made, in 1827 and '28, in Italy and Greece, in company of the Duc de Luynes, during which he explored the site of the ancient city of Metaponte, the results of the exploration being recorded in a folio volume under the title of "Metaponte," published by himself and the Duc de Luynes jointly, at Paris, in 1833. He also made some interesting discoveries of fragments of painted decoration, one of which he presented to the École des Beaux-Arts. On Debacq's return to France, where he was many years Inspecteur des Travaux to the Municipality of Paris, he occupied himself mainly with the work brought him by his connexion with the Duc de Luynes, for whom he built various residences in Paris and its neighbourhood, and designed among other things the funeral chapel for the Luynes family in the church at Dampierre, a work which was carried out in collaboration with M. Charles Garnier, then just returned from Greece. Debacq was elected, in 1833, a member of the Institut Archéologique of Rome, and since 1841 was a member of the Société Centrale des Architectes Français.

GENERAL BUILDING NEWS.

UNIVERSITY COLLEGE, LIVERPOOL.—On Tuesday afternoon the Victoria Building of Liverpool University College was opened by Earl Spencer, K.G. The western wing of the building, which adjoins the engineering block, and is separated from it on the ground floor by a wide carriage archway, with a groined roof, leading into what will be eventually the inner quadrangle of University College, contains the Tate Library. The most noticeable feature of the southern elevation is the Jubilee Tower, which rises over the central entrance. The exterior generally is of ordinary selected local bricks, with red terra-cotta dressings, supplied by Messrs. Clark & Rea, of Wrexham, the modelling being executed by Messrs. Farmer & Brindley. This treatment is further relieved in the library wing by bands of red Ruabon brickwork. The central entrance leads into a vestibule, which lies within the four walls of the tower, and gives access to the great hall, a large chamber two stories in height, with an apsidal termination at the east end, separated from the staircase by a range of arches, which form a kind of aisle on the southern side. This hall, which is 68 ft. long and 30 ft. wide, is lighted by tall mullioned and transomed windows on the north wall, and is lined with Burmantofts faïence, a material which also forms the mural decoration of the principal staircase. East of the hall, in the portion of the building placed under a large semicircular theatre, lie the students' common-room and reading-room. On each side of the vestibule are the clerk's and porter's respective rooms, while the long corridor (100 ft. in length) which leads from the hall to the Engineering block, has class-rooms on the north side and professors' private rooms on the south. The first floor, which may be reached either by the principal staircase or by two secondary flights, contains more class-rooms (the largest of which is 43 ft. by 22 ft.), and one or two professors' rooms. Over the archway comes a reading-room, connected with the Senate-chamber, which latter is 27 ft. square. The turret at the south-east corner contains a circular staircase, which does not communicate with the first-floor, but passes on to give access to the upper seats of the theatre. The second floor contains the lecture theatre, which seats 500, and the library. The library is a rectangular room, which extends the entire length of the wing from the great tower to the Walker Engineering Laboratories, with which it admits of communication through the special readers' room above the western gateway. The full length thus appropriated is 136 ft., while the main rectangle is 102 ft. by 49 ft. The theatre, which is a semicircle in form, has a radius of 39 ft., and the floor space of the library measures no less than 102 ft. by 49 ft. The entrance to the library is through a vestibule lying just off the principal staircase, in which is placed a bust of Mr. Tate, by Mr. Gilbert, A.R.A. Beyond the library is the librarian's room. The third floor is mostly occupied by the upper part of the library and the lecture theatre. What remains of the story is given up to the requirements of art. The building is fireproof throughout, the floor being of concrete on an iron framework supplied by Messrs. Handyside & Co. The general contractors were Messrs. Brown & Backhouse, and the whole of the works have been carried out under the supervision of Mr. Battye, clerk of the works. Messrs. A. Waterhouse & Son are the architects, the design, which we illustrated in the *Builder* for June 1, 1889, having been prepared by Mr. Waterhouse, R.A., in 1888, from which year the contract dates. Messrs. Hart, Son, Peard, & Co. supplied the electric-light fittings and the metal work generally; Messrs. John King, Limited, did the heating; and Messrs. J. F. Ebner & Alfred Walker were respectively responsible for the mosaic floors and the cement staircases. Mr. Ebner also executed the parquet and wood-block floors. The electric lighting was carried out under the superintendence of Mr. A. L. Taylor; the bells in the Jubilee Tower being supplied by Messrs. John Taylor & Son, Loughborough.

NEW WING, DURHAM SCIENCE COLLEGE, NEWCASTLE.—The foundation-stone of the new wing of the Durham College of Science, Newcastle, was laid on the 5th inst. by the Earl of Durham. The new buildings are to be erected at right-angles to the existing wing, and will equal in bulk the portion first erected about five years ago. In the centre is the Royal Jubilee Exhibition Tower. It is built from the surplus of the Jubilee Exhibition, and comprises a gateway surrounded by four octagonal "sentinel turrets," each 95 ft. in height, and surmounted by ornamental ironwork. The turrets are to be made to serve respectively for (1) chimney, (2) ventilating shaft, (3) experimental tower with a mercury column 100 ft. high for testing gauges, and (4) coal hoist and staircase. Above the gateway are the following rooms, all in the tower:—Class-room for general purposes, two private rooms for professors, common-room for art masters, and professors' common-room. On the right of the gateway are the following rooms:—Chemical lecture theatre; six rooms above the lecture theatre, for special and advanced work in chemistry; a large class-room, occupying the Mansard roof above the last-mentioned rooms. There is also a boiler-room, affording accommodation for two Lancashire and one marine boiler, with measuring tanks and other appliances for the conduct of efficiency and other tests. This is a single-story building, enabling the boilers to be placed quite outside the main building. On the other side of the gateway, on the ground floor, are the following:—Metallurgical laboratory and balance-room, with furnaces adjoining the chimney-shaft; engine and dynamo room, 40 ft. long, 35 ft. wide, and 21 ft. high. Here, also, is the George Stephenson engineering laboratory, 123 ft. long and 35 ft. wide, with an annexe measuring about 90 ft. by 10 ft. On the first-floor are: Lecture-room, 35 ft. square, for metallurgy and other subjects as required, such as building construction, &c.; lecture-room, 40 ft. by 35 ft., for engineering and naval architecture; engineers' drawing-office and model room, 123 ft. by 35 ft. This room will serve as the great examination-hall. The second-floor will comprise the following rooms:—Life class-room, adjoining the art masters' room; art lecture-room, 40 ft. by 35 ft.; and suite of art-galleries, all provided with roof-lights on the north side for the whole length, and measuring 123 ft. by 33 ft., with a clear height of 20 ft. in the centre. The roof principals are constructed of steel with gusset stages. The whole building will be heated by exhaust steam from the main engines, and will be lighted by electricity. The architects of the new building are the late Mr. R. J. Johnson and Mr. Frank W. Rich. The following are the contractors:—Brickwork, stonework, and joinery, Mr. J. E. Middlemiss; steel work for the floor, girders, and roof principals, Messrs. Dorman & Long; plumbing work, Mr. Mansfield Gibson; steam heating, Messrs. Dinning & Cooke; decorative work, Messrs. J. Richardson & Co.; plastering, Mr. W. Ferguson; tiling, Mr. C. Nicholson.

CO-OPERATIVE BUILDINGS, LINCOLN.—The foundation-stone of a sub-central store for the Co-operative Society was laid at Lincoln on the 3rd inst. The building will have a frontage to the High-street of 65 ft., and a depth from front to back of 60 ft., and will be three floors in height. The ground floor will be divided into three shops. Cellarage is to be provided under the whole area. Staircases of easy ascent are provided to all departments, and ample light will be secured to all floors. The whole building will be heated by hot water at high pressure, and ample lavatory accommodation is provided. A central office is to be provided for the general manager, which will command all departments. An

external hoist will be provided, and a hoist in a central position inside the building communicates with each floor. A roadway will be made to the back of the premises from Tanner's-lane. The front elevation is of Renaissance character; the ground floor will have rusticated stone pilasters and moulded stone cornice. The first floor will be divided into six bays by brick pilasters, and will also have a stone cornice; each of the bays will have a large semi-circular headed window with stone imposts, arches, and key-stones; surmounting this will be a terra-cotta parapet, divided into panels bearing the name of the Society, with stone coping. The cost of the work will be about 5,000*l*. The contractors are Messrs. Wright & Sons; the clerk of the works for the brickwork is Mr. C. Robinson, and for the woodwork Mr. Panton. The whole of the work has been designed by, and will be carried out under the supervision of, Mr. J. H. Cooper, architect.

Chancel, St. Paul's Church, Bedminster, Bristol.—On the 23rd ult. the consecration took place of the new chancel of St. Paul's Church, Bedminster. The work was commenced in April. The chancel is 29 ft. in depth, with an organ-chamber on one side and a vestry for the clergy on the other, with accommodation for the choir in an apartment beneath. The work is in the Early Perpendicular style. The floor of the chancel is formed of polished marble. Mr. E. W. Barnes, of Bristol, is the architect, and Mr. George Humphreys is the builder.

New Police-Station at Neepsend, Yorkshire.—A new police-station at Neepsend, situated at the corner of Burton-road and Hicks-street, has just been completed. The main elevation, which is towards Burton-road, is carried out in pressed red bricks, with stone dressings, and is broken up by two gables, one of which is above an arched gateway leading into the parade-ground. The buildings consist of a charge-office and search-room, with two cells, and lavatory and closet accommodation for officials and prisoners. There are also two dwelling-houses for police-officers abutting upon the station-yard, but the charge-office, cells, &c., are so arranged as to be self-contained, and completely shut off from the dwelling-houses, as well as from the adjoining street. Further cell accommodation can be added when required. The buildings have been designed and carried out by the Borough Surveyor and his staff at a cost of about 1,650*l*., the contractors being Messrs. Walker & Slater, of Derby.

Restoration of Bourn Abbey Church.—The reopening, after restoration, of Bourn Abbey Church took place on the 5th inst. The restoration has been effected at a cost of about 1,400*l*. Mr. Traylen, Stamford, and Mr. Shilcock, Bourn, were the architects, and Mr. Roberts, Stamford, the contractor.

Mission-hall, &c., Kensington.—The rebuilding of St. Mary Abbotts Mission-hall and Infant School, for the Hon. the Rev. E. Carr Glyn, M.A., will shortly be undertaken. The infant school will be built according to the requirements of the Education Department, and the plans have been approved. The architect is Mr. T. Phillips Figgis, A.R.I.B.A.

Proposed Technical Instruction School for Stamford.—A scheme has just been published by the Technical Education Committee for the borough of Stamford for the erection of a technical school in the town. The plans have been prepared by Mr. J. C. Traylen, a local architect, and show that the proposed building would have a frontage to Broad-street, the site being the Shambles. The plans provide for an upper room, about 50 ft. by 18 ft., with movable partitions, well lighted to the north; while below are shown two rooms (one on each side of the entrance), a staircase, lavatories, &c.

New Porch and Baptistery, Manchester Cathedral. — According to the *Manchester Guardian*, one of the last important works of the Manchester Cathedral restoration,—the erection of the new south porch and baptistery,—may now be considered as practically completed. The porch is outside of Darley Dale stone, from the Derbyshire quarries of the late Sir Joseph Whitworth, and of Carlisle stone inside. The design is in accordance with the general architecture of the church. In the interior of the baptistery the pavement immediately surrounding the font is of Roman mosaic. At the four angles are panels representing the four Evangelists. Outside this panel the baptistery is paved with dove, red, black, and white marble. The font, which formerly stood near the north entrance to the nave, has been removed to the new baptistery. The marble pavement, mosaics, &c., in the baptistery have been executed by Messrs. J. & H. Patteson, Manchester, who have also, we are informed, executed the marble and mosaic flooring throughout the building.

Clock, Copt Hewick, near Ripon.—Mr. Joseph S. Hurst, J.P., of Copt Hewick Hall, having offered to erect a clock-tower in the village at his own cost, Messrs. Potts & Sons, of Leeds, have been commissioned to supply the clock, which will have four dials, illuminated at night, and having also a bell for striking the hours.

SANITARY AND ENGINEERING NEWS.

Sewerage, Northallerton. — The Northallerton Local Board of Health have adopted a scheme of main sewerage for the drainage of part of the town and the County Prison, according to plans prepared by Mr. D. Balfour, M.Inst.C.E., of Newcastle-on-Tyne.

Sewage Disposal at Sale.—The Local Government Board has now approved of the scheme prepared by Mr. A. G. McBeath, Surveyor to the Board, for the purification of the sewage of the township, and given its sanction for the borrowing of the money, about 19,500*l*., necessary for the purchase of the land and the execution of the various works. The plans were submitted to the Local Government Board in 1890, in order to meet the requirements of the Rivers Pollution Act, as pointed out in a circular issued by the Manchester Ship Canal Company. The system to be adopted for the purification of the sewage is one of precipitation and filtration, the precipitation being effected by the ferrozone, and the filtration by polarite filter beds under the International Water and Sewage Purification Company's process. The effluent will flow into the Mersey by gravitation. The sludge will be treated so as to form manure. The site of the works is near the Bridgwater Canal. They will cover an area of 5½ acres, but the total area to be acquired for sewage and other purposes is 15½ acres, leaving ample room for extension hereafter if necessary.

Pollution of the Yeo.—The Wincanton Rural Sanitary Authority having been threatened with an action for alleged pollution of the Yeo, near its source, by the discharge of sewage from the town of Milborne Port, without proper treatment, called in Mr. A. P. J. Cotterell, C.E., of Bristol, to advise them upon a better system of disposal. His report was considered by a Vestry meeting at Milborne Port, and was unanimously passed, and having since received the approval of the Sanitary Authority, instructions have been given to proceed. The sewage will be treated with ferrozone just before reaching the existing outfall tanks, whence, after deposit, the effluent will be carried in pipes to the Henover Meadows. Here 16 acres of ground will be prepared for irrigation, the ground being deep-ploughed, and the surface formed into panels or divisions for intermittent filtration, and the purified water will thence be conveyed to the stream.

STAINED GLASS AND DECORATION.

Four-Light Window, Wedmore Church, Somerset. — The parish church of Wedmore, Somerset, has just received a memorial window consisting of four lights from the studios of Messrs. Mayer & Co. The subject selected for treatment was an illustration of the forty-ninth chapter of Genesis, and comprises Jacob and his twelve sons, with women, &c., in the background.

Window, Parish Church, Brent Knoll, Somerset. — The east window of the Parish Church of St. Michael, Brent Knoll, Somerset, has just been filled with stained glass. The three principal lights are occupied by three Archangels. St. Michael is represented in the centre with a spear, in the act of treading upon and piercing the dragon; St. Raphael, in the character of a pilgrim; while St. Gabriel, bearing the lily of the Annunciation, and the first words of his message, "Ave Maria," on a scroll, occupies the chief place in the third compartment of the window. Under these are represented smaller accessory figures in medallion panels. The design and execution of the work have been carried out according to the instructions and specifications of Archdeacon Fitzgerald by Messrs. Wailes & Strang, of Newcastle-upon-Tyne.

Memorial Window, Manchester Cathedral. —Another memorial window is just completed in Manchester Cathedral, being the new four-light window on the south side of the recently-erected baptistery, at the west end of the nave. The new window, which has been executed by Messrs. Percy Bacon & Brothers, of London, consists of four lights, the subject treated being the Saviour in the act of blessing little children.

FOREIGN AND COLONIAL.

France.—At the close of the recent Ministerial crisis M. Charles Dupuy, deputy of the Haute Loire, was nominated Minister of Public Instruction and Fine Arts, in place of M. Bourgeois, who has become Minister of Justice.——M. Antonin Proust has just resigned his post as General Commissioner of Fine Arts in the French section of the Chicago Exhibition. He has been replaced by M. Roger Ballu, General Commissioner of Foreign Artistic Exhibitions.——M. de Baudot, architect, has just commenced his course of French architecture at the Trocadéro Palace, on the Moyen Age and Renaissance. This course is to be in two parts, 1st, studies of character in the different periods of French architecture, forms and methods of structure; 2nd, methods to be followed and means to be employed in restoring historical monuments.——The fine portrait of M. Alphand, by the painter Roll, is to be placed in the Hôtel de Ville in the hall of the Commission of Roads and Streets.——A large and curious mosaic, found at Vienne, in Dauphiné, representing the occupations of man during the different months of the year, has just been placed in the Louvre Museum, in the Hall "des Prisonniers;" around this mosaic are to be arranged the Soissons' "Pedagogue," the Bordeaux sarcophagi, and the Arles Faun. Thus the ancient Gallic sculptures will all be grouped in one part of the Louvre.——A commemorative monument, erected by the Société des "Souvenirs Français," has just been inaugurated at Domont (Seine and Oise) to the French soldiers and sailors who have died for their country.——The society of Fine Arts of Carcassone will open their first exhibition on January 1.——A few days ago a great fire destroyed the Hôtel de Ville at Langres, which contained the public library, the archives, the magistrates' court, and the tribunals. Nothing has been saved.——The Financial Committee of the Senate, who were appointed to examine the project relating to the rebuilding of the Opéra Comique, have concluded to adopt it, as it has been voted by the Chamber, in spite of the protests of the architects against it. The same committee have rejected the Bill to give up the grounds of the old Cour des Comptes to the Central Union of Decorative Arts. —— The Company of the Chemin-de-Fer de l'Ouest are proposing to establish a bridge for the line of Bolbec-Pont-Audemer, crossing the Seine to the environs of Quillebeuf. This bridge will be more than 300 mètres long, and will be raised more than 50 mètres above the level of the sea. The same company have just built a fine metal bridge over the Seine for the line from Paris to Havre, at the place called "Le Manoir," near Rouen. ——The death is announced of M. Edouard Charles Weyland, Government Architect-Surveyor of the Court of Appeal, and member of the Société Centrale. M. Weyland, who was fifty-four years of age, was the son-in-law of M. Duphot, the eminent Bordeaux architect, who died a few years ago.——We have also heard of the death, at the age of eighty-two, of M. Francois Jules Fevrier, honorary architect of the Department of the Haute Saône, and Chevalier of the Legion of Honour. M. Fevrier, who was a pupil at the Ecole des Beaux-Arts under the direction of Henri Labrouste, entered very early into notice, and carried out several important works in Paris. He was for thirty-two years architect of the Haute Saône, where he executed many large works. He belonged to the Société Centrale since 1843.——M. Daumet, President of the Société Centrale, has forwarded a letter from M. Charles Lucas to the Minister of Finance, asking for the restoration of the bust of the eminent architect of the Hôtel des Monnaies to its old place of honour on the grand staircase of this palace.——The jury for the competition of the first class of architecture at the École des Beaux-Arts has awarded the first medals to MM. Delaunay, Garnier (Tony), Pille, and Howard, and second medals to MM. Boucher, Debat, and Evrissaint.——The old palace of the abbés of St. Germain des Prés is being restored. It was built in 1589 by the Cardinal de Sourbon, and was the scene of the massacres of September, 1792. It is now occupied by numerous scientific societies.

Berlin.—The subject for the Schinkel Medal Competition of 1893 will be a club-house,—a novelty for German architects, as clubs are not a feature of German life. Berlin, in fact, can only boast of three respectable clubs, of which two have their own houses. Competitors would do well to cross the Channel and study English club-houses, especially as their "sending-in-day" is quite a year hence.——The long-expected Berlin "Suburban" Building Act was published on Monday, and proves to be a highly-interesting piece of building legislation. Much attention has been paid in it to questions of sanitation and fire-risks. The new Act warns us of an approaching "Greater Berlin." ——The invaluable Royal Prussian testing-station at Charlottenberg has again been of great service to architects during its past year. About a thousand different materials have been reported on, and these reports were based on some twenty thousand tests. Of the thousand different materials, eight hundred were either natural or artificial stone.——The Berlin telephone system is to be greatly extended. Ninety provincial townships are now to be connected with the capital.

Messrs. James Stiff & Sons.—In consequence of the misleading terms in which the notice of Mr. James Stiff's retirement appeared in some of last Saturday's papers, we are asked to state that the dissolution of partnership between J. Stiff, W. Stiff, and E. Stiff, trading under the name of James Stiff & Sons, London Pottery, Lambeth, S.E., is simply the formal notice of the retirement of Mr. James Stiff, which occurred in the year 1876, in accordance with the provisions of the partnership deed. The business has been, and will be, carried on under the same style by the two remaining partners, who have had the entire management for the last twenty years.

MISCELLANEOUS.

THE EGYPT EXPLORATION FUND.—The sixth ordinary general meeting of this Fund was held on Wednesday afternoon, Mr. E. Maunde Thompson, of the British Museum, in the chair (in the absence of the President (Sir John Fowler). Mr. Charles Dudley Warner was elected an Honorary Vice-President for America, in the room of the late Hon. G. H. Curtis, and Mr. R. S. Poole was elected Honorary Secretary, in the place of the late Miss Amelia B. Edwards, whose devotion to the work of the fund was highly eulogised. Satisfaction was expressed that the Fund had now convenient central offices at 37, Great Russell-street, Bloomsbury. The financial report of the Honorary Treasurer, Mr. H. A. Grueber, for 1891-92, which was then read, showed that the finances of the Fund were in a satisfactory condition. The total expenditure for the year 1891-92 had been 2,474*l.* 15s. 5d., including (1) for M. Naville's expenses connected with his excavations at Tmei-el-Amdid, Baglieh, and Tell Mokdam, 365*l.* 17s. 1d.; (2) for Count d'Hülst's work at Behbeit-el-Hagar, 527*l.* 15s. 10d.; (3) for the transport of the sculptures found at Ahnas in the previous season from London to their several destinations in England, America, and Australia—351*l.* 17s. 6d.; (4) for the costs of the capital of the column from Ahnas, which were presented to the British Museum—9*l.* 16s.; and (5) for the survey fund—681*l.* 19s. 2d. The total receipts for the same period had been 2,673*l.* 15s. 8d. The report was adopted, on the motion of Mr. Pollard, seconded by Mr. W. Fowler. The Chairman said that the society now numbered 1,500 members, which showed the vastly-increased interest which was now taken in the history and antiquities of Egypt. The secretary, Miss Paterson, then read her report, in which, after referring to the excavations accomplished by M. Naville during last season, she said that some monuments of the 30th Dynasty had been found at Behbeit-el-Hagar, and earlier inscriptions might still be forthcoming; but the turning and examination of the huge masses of stone encumbering the site was not yet completed. Since the general meeting in March, Mr. Newberry and Mr. Griffith had been engaged in preparing the manuscript and plates of the two volumes of Beni Hasan for the Press, and it was hoped that the first volume would be issued in a few weeks. The very fact that Mr. Newberry brought back some 14,000 square feet of tracings would give some idea of the time required to prepare them for the press. The site of Tel-el-Amarna and the tombs which adjoin it would provide material for this season's work, and promised results of peculiar interest, both historic and artistic. The report was adopted, and M. Naville then gave an interesting account of his investigations at Tmei-el-Amdid.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—At the meeting of this Association on Wednesday, the 7th inst., Mr. C. H. Compton in the chair, Mr. Woods exhibited a fine and perfect vase, of Roman pottery, recently found at Colchester, with other objects of the same age. Mr. Earle Way described a collection of relics, mostly of Roman date, which have recently been found at Bankside, close to the site of the old Globe Theatre. Among these were pieces of chain mail mingled with human bones, apparently those of the wearer. A portion of a rough Roman pavement has been unearthed, and also several bone implements of prehistoric date, deposited in black earth prior to the embankment of the Thames, a work of Roman date. The Rev. D. Bowen sent photographs of Monkton Church, Pembroke, showing the building restored from a state of ruin. The Rev. Oliver Minos described some early wall paintings in the Church of Middleton-on-the-Hill, Hereford, the form of an ancient chalice being well defined. Mr. Sheraton forwarded for exhibition a bronze celt of early form, found at Llandudno. Mr. J. P. Pritchett described the Early carved bosses in the choir of Selby Abbey; and Mr. Curtis (Ward & Hughes) gave a description of his restoration of the beautiful stained glass in the east window of the church. It dates from about 1380, the subject being the Root of Jesse. All the recently discovered glass has been replaced, the work having been executed at the expense of Mr. Leversedge. A paper was then read by the Chairman, written by the late Mr. J. W. Grover, entitled, "Have I found the site of the Roman station Bibracte?" The recorded existence of this station rests upon very slender evidence, and the village of Bray has been frequently pointed to as the probable site. Mr. Grover, however, pointed out that the site of a Roman settlement, called The Town, existed to the south of Cæsar's Camp, at Bracknell, as the line of two Roman roads, midway between Staines and Silchester. The villagers speak of foundations and pavements existing beneath the thick plantations which cover the site. Although the existence of the station Bibracte is open to doubt, there can be none but that some sort of station existed here. Mr. Loftus Brock, F.S.A., exhibited a fine specimen of stamped bookbinding, contemporary with the volume which was printed at Leyden in 1482.

APPOINTMENT UNDER THE BUILDING ACT.—The District of Shoreditch and the Liberty of Norton Folgate has been conferred on Mr. Henry Lovegrove, District Surveyor of South Islington. It is a curious fact that the amalgamated district contains three Vestry Halls.

THE PREMATURE PUBLICATION OF COUNTY COUNCIL REPORTS.—We trust that the London County Council will make haste to rid itself of the suspicion that it harbours a parasitical section, calculated, before long, to bring it into bad repute. We desire to call attention to what seems to be nothing short of a public scandal. We say this advisedly, notwithstanding the impression in the public mind of the immaculate attributes of the average County Councillor. A daily paper has, thanks to the inability of some member or members to observe the unwritten but recognised law that reports of committees are "private and confidential," been enabled to print the full text of such reports two days before the meeting of the Council. The enterprise of the proprietors, to whom such fish is valuable, is commendable, but the action of the parties who supply the "copy" needs only to be mentioned that it may be condemned. The practice has now grown to such an extent that the proceedings of the committees, although closed to the Press, become public property in a few hours. Some of this information is undoubtedly due to the powers of enterprising journalists, but the majority of it must be, and is, given by the members themselves. If the Council is to be honeycombed with men who have seats upon it for the purpose of adding to their incomes by the betrayal of confidential documents, then good-bye to purity of administration, for it follows, "as the night the day," that such members will not be proof against the blandishments and bank-notes of persons who desire favours at their hands. We do not care to what political party these parasites may belong: the poorest members may be the most honest; but the Council must, if it is to live, be purged of those members in whom confidence is an unknown quantity, and from whom secrets may be bought with gold. It is of no use to mince matters; a blow must be struck, and we hope the Council itself will deal with the scandal in a vigorous fashion.—*Local Government Journal.*

"LEIGHTON'S CHIMNEY-COWL."—We have received from the patentee particulars and illustrations of Leighton's "Smoke Preventer Chimney-cowl," which would be found useful for certain cases of smoky chimneys, but which, like many other patented articles, possesses, as its distinctive feature, a positive detriment to its efficiency. A horizontal tube revolves on a spindle and points in the direction of the wind, but the inventor has spoilt his work by the introduction of a coned aperture within the tube under the impression that he is thus adopting the principle of the injector of a steam-engine. The mistake lies in forgetting that the injector uses a *small* amount of steam at high-pressure to do certain work in a convenient way, whereas in a cowl there is a *large* amount of wind to be utilised, and the only satisfactory way of doing this in cowls of this type is by a trumpet mouth to the tube itself, in which the inventor has been anticipated.

JUNIOR CONSTITUTIONAL CLUB.—We understand that the decorative work on the front of this building was modelled and carved by Mr. Gilbert Seale.

TESTING THE DRYNESS OF HOUSES IN COPENHAGEN.—In Copenhagen, as in most other Continental cities, regulations are in force to the effect that no dwelling-houses must be taken possession of until "perfectly dry." This term is, of course, very elastic, and it is, therefore, proposed to establish a central office where the moisture of a building may be ascertained and certificates of "perfectly dry" issued. The normal of dryness,—*i.e.*, the limit of fitness for occupation,—is to be not above 2 per cent. of water in the mortar, and in order to ascertain this, samples of the latter are taken by a specially-constructed tester in all layers of the building. These samples are carefully ground, placed in jars, closed hermetically, weighed, and finally placed in a double-sided vacuum of copper. Under a heat of 100 deg. Celsius the process of drying will be effected in from half to one hour, and the moisture may then be ascertained by weighing the sample anew when cooled; and by taking the average of the moisture in all samples the humidity of the whole building is ascertained.

STREET-PAVING EXPERIMENT IN GLASGOW.—The *Glasgow Evening Citizen* of the 6th inst. reports that the Police Commissioners of Glasgow have given permission for an experiment to be made with a street-paving material that is at any rate new to Glasgow. Hitherto, granite, whinstone, and wood have been almost exclusively used in the formation of the city thoroughfares, and now a trial is to be made of a special prepared brick, known as the Omoa fire-clay brick. These bricks measure 9 in. by 3 in. by 5 in. The experiment is to be made in Buchanan-street, in that part which is above Sauchiehall-street, leading to the Buchanan-street station, where the traffic is abnormally heavy. The bricks will be laid on a good sound foundation, and everything done to make the test a fair one. The danger of water percolating between the seams and cracking the bricks in time of frost is, we are told, "to be obviated by the insertion of thin slips of wood between the blocks, over which cement will be spread, so that the bricks will be flush with each other and the surface level, and perfectly waterproof." It is further stated that, unlike granite setts, the bricks will not wear smooth, but will always have a rough facing, and thus have a good footing for horses. It is also proposed to pave a portion of Gordon-street, where the traffic is lighter, in a similar manner. On the question of cost, it is stated that these brick pavements can be laid at from 3s. 6d. to 4s. 6d. per square yard.

ELECTRIC LIGHTING IN SOUTHPORT.—At the Southport Town Hall, on the 8th inst., Colonel John Ord Hasted, R.E., held an inquiry on behalf of the Local Government Board into an application by the Southport Town Council for sanction to borrow 28,000*l.* for the purposes of electric lighting. The Town Clerk (Mr. J. Davies Williams) opened the case for the Corporation, who propose to put down generating plant on land adjoining the gasworks at Crowlands, on the outskirts of the town, and to lay two high tension trunk cables, one to the business part of the town, and one to the Hesketh Park, or more residential part of the borough, connecting the two by another line along Albert-road and Lord-street. The system to be adopted had not been definitely decided upon. Evidence was given by Mr. W. Wilkinson, M.I.E.E., and Electrical Engineer to the Corporation, and Mr. J. Booth, Gas Engineer. There was no opposition.

COLOUR COPYING.—We have received from the Colour Copying Co., of Broad-street House, E.C., particulars and examples of a new process of rapidly producing copies of coloured plans or mechanical drawings or maps, which must be executed in a certain medium sold by the Company, and from which two or three dozen impressions can then be rapidly taken off, giving the colour of the original a good deal fainter, but still so clear as to be practically useful. A plan of a house, for example, is reproduced in a few minutes, with the distinguishing colours of red for the brick walls and yellow for the partitions quite sufficiently distinct for practical purposes, and from thirty to forty such reproductions can be made from one drawing. The important point of course is, whether the colouring media and the ink to be used are satisfactory to work and likely to be permanent, which latter is sometimes an important matter in the case of working drawings. If satisfactory in that respect, the process would certainly be useful where several repetitions of a plan or a map are wanted in a short time; and the cost of the process is trifling.

LEGAL.

A SCHOOL BOARD ARBITRATION CASE.

IN February last Messrs. W. H. Lorden & Son, builders and contractors, Trinity-road, Upper Tooting, S.W., brought an action against the School Board for London for the sum of 460*l.* 5s., being the balance of 75 per cent. of an account of 1,413*l.* 13s. 4d. (600*l.* having been previously paid, leaving a total net balance of 813*l.* 13s. 4d.), for alterations to a house in Battersea Park-road, in forming new entrance and drainage, &c., to the "Latchmere" schools, which action was, by the consent of the parties, referred to arbitration. The President of the Royal Institute of British Architects appointed Mr. Charles Barry as arbitrator, who, after nine meetings at the Surveyors' Institution (in which Mr. Pollard appeared for the plaintiffs, and Mr. Boyle for the defendants) and one meeting on the site, gave his award on November 29 as follows:—"As to the plaintiffs' claim for 460*l.* 5s., being the balance of the 75 per cent. of the value of the work done and materials supplied, subsequently by the consent of the parties increased to 813*l.* 13s. 4d., being the full amount of the balance claimed to be due in respect of said work done and materials supplied, I award and adjudge that the defendants do pay to the plaintiffs the sum of 745*l.* And as to the defendants' claim for compensation for delay, I further award and adjudge that the defendants have no claim or demand against the plaintiffs with respect thereto. And I further award and adjudge that there are no matters in difference in reference to the said works between the parties other than those with which I have hereinbefore dealt. And I further award and direct that the defendants do pay to the plaintiffs their costs of and incidental to the reference, and the costs of the award, and that the defendants do bear their own costs of the same."—(*Communicated.*)

MEETINGS.

FRIDAY, DECEMBER 16.

Architectural Association.—Mr. F. Inigo Thomas on "The Formal Garden." 7.30 p.m.

SUNDAY, DECEMBER 18.

Sunday Lecture Society.—Dr. Percy F. Frankland on "The London Water Supply,—a scientific answer to a popular question." 4 p.m.

MONDAY, DECEMBER 19.

Royal Institute of British Architects. — Professor Attchison, A.R.A., will read a paper by Dr. William Dörpfeld, F.S.A., Hon. Corr. Member, on "The Hypethral Temple." 8 p.m.

Surveyors' Institution.—Mr. E. Tidman on "Sanitary Ventilation." 8 p.m.

Leeds and Yorkshire Architectural Society. — Social Evening. 7.30 p.m.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premium.	Designs to be delivered.
Laying-out Ornamental and Recreation Grounds	Leeds Corporation	20l. 10l.	Dec. 28
*Board School for 700 Children	Gravesend (U.D.) Sch. Board	15l. 2nd, 10l. 3rd	Jan. 16
Parish Rooms, Barnstaple Parish Church	The Committee	35 Guineas	Jan. 21

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Iron Castings, Waterworks	Bury Corporation	Thos. Rigby	Dec. 20
Work at Public Baths	Barnsley Corporation	J. H. Taylor	do.
Road Metal, &c.	do.	do.	do.
Sewerage Works, Hoxton, N.	.....	H. M. Robinson	do.
Alterations, &c. School Buildings	Llandebie United District Sch. Bd.	D. Jenkins	do.
Restoration of Llanwonno Church, Pontypridd	.....	Halliday & Anderson	do.
Offices, High-street, Maldon	Orttewell & Son	T. M. Beaumont	do.
Paving, &c. (six roads)	Plymouth Corp.	G. D. Bellamy	do.
Cement and Stoneware Pipes	Merthyr Tydfil Loc. B.	*Official*	do.
Steel Tyres	Bengal & N. W. R. Co.	do.	do
Steel Work	Rohilcund & Kumaon Ry. Co.	do.	do.
Ironwork	Indian State Railways	do.	do.
Rolled Iron, Zinc, &c.	Prussian Royal Rails.	do.	do.
Thirty-eight Drying Closets, Fittings, &c. at Workhouse	Belfast Union	do.	do.
Additions, &c. to School Buildings, Kingstreet	Plymouth Sch. Bd.	do.	do.
*Construction of Sewer	Lewisham Bd. of Wks.	do.	do.
Stables, West Hoe	Plymouth Corp.	G. D. Bellamy	do.
Forty Cast-iron Side Entrance Covers	Southport Corp.	W. Crabtree	Dec. 21
Additions, &c. School Buildings	Porchester Sch. Bd.	W. Yeardye	do.
House, Newgate Fields, St. Leonard's	Hastings Corp.	Philip H. Palmer	do.
Iron Castings, &c.	Nottingham Corp.	*Official*	do.
Supplying and Fitting Laundry Machinery Water Mains, &c.	Barton-upon-Irwell Union	Mangnall & Littlewoods	do.
*Supply of Slop Vans	Mile End Vestry	J. M. Knight	do.
Firebricks, Cement, &c. Wotton	Gloucester County Asylum Com.	*Official*	do.
Station Buildings, &c. Shiplake	G. W. R. Co.	do.	do.
Masonic Hall, East Grinstead	A. M. Betchley	.....	do.
Reconstruction of Viaduct, Ramsbottom	Lancs. & Yorks. R. Co.	*Official*	do.
*Laying Sidings at Plympton and Hemerdon	G. W. R. Co.	do.	do.
*Bridges, Hayle and St. Erths	do.	do.	do.
Reservoir, &c. Namur	Belgian State Railways	do.	Dec. 22
Boiler Tubes, &c.	Prussian Royal Rails.	do.	do.
Additions to Workhouse	Ballymahon (Ireland) Union	do.	do.
Cemetery Work	Rotherham Burial Bd.	E. J. Hubbard	do.
Eight Cottages, Gelligaer	H. P. D. Phillips	J. H. Phillips	do.
Renovation of Chapel, Chatteris, Cambs.	Rev. C. Higgins	.....	do.
Eight Houses, West Vale, Halifax	Industrial Society	S. Wilkinson	do.
Three Terrace Houses, Rastrick, Yorks	.....	G. Hepworth & Son	Dec. 23
Gas Retorts, &c.	Birkenhead Corp.	T. O. Paterson	do.
Villa Residence, Elland, Yorks	.....	J. Berry	do.
Road Metal (1,700 tons)	Rugby Local Board	*Official*	do.
Waterworks (Contracts 2 & 3), Gwernymynydd, Mold	Gas and Water Co.	do.	Dec. 24
Timber, Dublin	Alliance and Dublin Consumers Gas Co.	do.	do.
Ironwork, &c.	Bolton Town Council	do.	do.
Surveyor's Stores	Leicester Corp.	E. G. Mawbey	do.
Granite Kerbs, Setts, Road Metal, &c. (large contract)	do.	do.	do.
Five Shops and Houses, Gibbett-road, Halifax	do.	do.	do.
Additions to Saltcoats Schools	Ardrossan School Bd.	Jas. Farrar	do.
Church, Woodhall Spa, Lincs.	.....	J. Arman, Jun.	Dec. 26
		C. H. Fowler	do.

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Steel and Iron Castings, Leeds	Garforth Colliery Owners	*Official*	Dec. 26
Sewering, Paving, Flagging, &c. (sixteen streets)	Nelson (Lancs.) Corp.	J. W. Bradley	Dec. 27
Kerbing Setts, Pipes, &c.	Oldbury Local Board	H. Richardson	Dec. 28
*Sewerage Works	Wetherby U.R.S.A.	A. E. Preston	do.
*Lamp Columns	East Barnet Valley Local Board	G. W. Brumell	Dec. 29
Road Metal, Granite Setts, &c.	Waterloo-with-Seaforth Local Board	F. Spencer Yates	Dec. 31
School Buildings, Williamstown, Penygraig, Glam	Llantrisant School Bd.	J. J. Evans	do.
*Laundry Building	L. & S. W. Ry. Servants Orphanage	*Official*	do.
*Pulling-down and Re-erecting Six New Shops	West Hartlepool Corp.	do.	do.
Pumping Station	Bordeaux Municipality	do.	Jan. 1
Additions to School Buildings, Caythorpe	Newark School Board	do.	Jan. 2
Main Sewer, Dykenook	Accrington Corp.	W. J. Newton	do.
*Construction of Sewers, Roads, &c.	Portland Estate, East Grinstead	J. H. & H. E. Mathews	do.
*Schools, near Neath	Coedfranc Local Board	T. C. Wakeling	do.
House and Shop, Forres, N.B.	.....	W. Mackintosh	do.
*Sewerage Works	Newport (I. W.) R.S.A.	W. Lidstone	Jan. 4
*Building School	Wanstead School Bd.	J. T. Bressey	do.
Waterpipes, Pumps, &c.	Portsmouth Corp.	*Official*	do.
Waterpipes &c.	Portsmouth U.S.A.	do.	Jan. 5
Sewerage Works	Northallerton Loc. Bd.	D. Balfour	do.
*Erection of Porter's Lodge, &c. Banstead	Kensington & Chelsea School District	A. & C. Harston	do.
Road Metal (Flints), &c. Bognor	Sussex County Council	C. Adcock	Jan. 6
*New Stoneware Pipe Sewers	Hornsey Local Board	T. de Courcy Meade	do.
Police Station, Stamford ham	Northumberland C. C.	Jno. Creswell	do.
Additional County Offices, Moot Hall, Newcastle-on-Tyne	do.	do.	Jan. 7
Fire Escape Staircases, Workhouse	Brighton Union	S. Denman	do.
*Making-up of Private Roads	Hornsey Local Board	T. de Courcy Meade	Jan. 9
Road Works (eight streets)	Swindon New Town Local Board	*Official*	do.
*Public Abattoirs, &c.	Borough of Brighton	F. J. C. May	do.
Four Dwelling-houses, Scarlett-street, Burnley	.....	Hitchon, Son, & Lancaster	Jan. 12
Thirteen Houses, Ilkley	Henry Ellis	Jas. Atkinson	No date
Court House, Police Station, &c. Handsworth, Staffs.	Standing Joint Com.	J. P. Osborne	do.
Three Houses and Shops, Newhay, Rochdale	.....	R. Howarth	do.
New Roads, Culverts, &c. Monk's Park Estate, Northampton	Freehold Land Society	C. Dorman	do.
Reservoir, Grange-over-Sands	Grange Local Board	*Official*	do.
Two Houses, Blackpool	J. B. George	.....	do.
Fencing, Maidstone	Tootell & Sons	.....	do.
Laying out, Levelling, &c. Pleasure Grounds, Convalescent Home, Lanarks	Committee	.....	do.
Hotel, "Blair Athol," Swalwell, co. Durham	Matthew Taylor & Co.	B. F. Simpson	do.
Farmhouse, Lightcliffe, Halifax	.....	J. F. Walsh	do.
Alterations to Dundridge House, Harberton, Devon	R. Harvey	W. M. Tollit	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
Surveyor	Bridgend Local Board	150l.	Dec. 22
*Assistant Inspector of Sewers	Com. of Sewers (City of London)	175l.	Dec. 31
*Surveyor's Assistant	Wandsworth B. of W.	45s. weekly	Jan. 2
*Second Road Foreman	do.	40s. weekly	do.
*Assistant Surveyor, R. E. Civil Staff	Civil Service Com.	.....	Jan. 4
*Valuer and Surveyor, Ireland	do.	.....	Jan. 12

Those marked with an Asterisk (*) are advertised in this Number. *Competition, p.* iv. *Contracts, pp.* iv., vi., *&* viii. *Public Appointments, p.* xviii.

TUESDAY, DECEMBER 20.

Institution of Civil Engineers.—(1) Further discussion on Mr. John Rigby's paper on "The Manufacture of Small Arms." (2, time permitting) Mr. J. Emerson Dowson on "Gas Power for Electric Lighting." 8 p.m.

Glasgow Architectural Association.—Mr. John Honeyman on "The Conservation and Utilisation of Heat in Domestic Buildings." 8 p.m.

WEDNESDAY, DECEMBER 21.

Liverpool Engineering Society. — Mr. James H. Lynde on "Automatic Sprinklers." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting. 8.30 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

22,209.—WATER-CLOSETS: *J. A. Duckett.*—This invention is designed to effect further improvements upon an invention patented March 7, 1887, No. 3,431, and consists in an alteration in the construction and shape of the receptacle and its tipper, that the outlet may be turned round in any direction to secure a straight line from the centre of the tipper and its receptacle to the inlet of the closet basin or pan, in whatever position the latter may be situated. The back end of the receptacle is of a semi-circular or other suitable form in horizontal section, and, being placed next the wall, will admit of the receptacle being turned obliquely when required, so as to point in the direction of the closet basin or pan, whereby a considerable increase of flush is effected. The head and sides of the tipper are preferably in shape and outline similar to that of the interior of the receptacle.

9,093.—SASH-FASTENER: *W. Allen.*—This invention relates to improvements in sash-fasteners, the object being to provide a sash-fastener which shall securely close the window against burglars, and at the same time prevent the passage of draught or water between the meeting-rails of the two sashes. A deep groove is cut in the meeting-rail of each sash extending nearly or quite its whole length, so that when the sashes are closed the grooves are opposite each other. Into one of the grooves so formed is inserted a lath or tongue, preferably connected to two or more equal and parallel links pivotted in the said rail, the sashes being secured together by sliding the tongue from the meeting-rail of one sash into the other, so as to bridge over the joint.

10,498.—DRAIN DISINFECTION: *J. Arnold.*—This patent refers to a combined deodorising and disinfecting apparatus, which consists essentially of two vessels placed one above and partly within the other, with a ventilating opening formed therein and connected with the sewer, cess-pit, or drain. This ventilating opening has an adjustable dome-shaped cover, the dome dipping just to or below the surface of a disinfecting liquid contained in a tank formed around the ventilating opening, so as to be only just sealed thereby. The dome has a flange parallel with the liquid surface, and perforated with small holes, which become filled with the disinfecting liquid either by immersion or capillarity; and the gases, which, in escaping, must pass either through the holes or entirely beneath the flange, are brought into prolonged and intimate contact with the liquid in the tank around the ventilating opening. This tank is kept constantly supplied with a chemical in a state of solution, and is caused to overflow in regulated quantity, discharging through the ventilating opening into the sewer, &c. The overflow formed in the ventilating opening leads out from the inside of the dome to prevent the direct escape of sewer gases without passing through the liquid, and it terminates in a run formed at the lower end of the ventilating opening, to which a regulated quantity of another liquid is supplied from a lower tank, the two liquids being such that by their chemical combination gases will be generated having a powerful disinfecting and deodorising action on the sewer gases as they ascend through the ventilating opening, and before reaching the dome.

11,151.—DOOR-CHECKS: *J. S. Shrawder.*—This invention relates to a door-check and closer, operating by means of a cylinder and piston. It consists of a pneumatic door-check and closer so constructed and arranged that, first, the force of a spring tending to close a door will be opposed to the influence of a vacuum exerted upon one face of the piston of the device suitably connected with the door; secondly, that the strain thereon will not exceed the pressure of the atmosphere on the face of the piston partially counterbalanced by a vacuum created in rear thereof, in order that the door may be permitted to gently close under the influence of a spring, and, thirdly, that the pressure thereon will not exceed at any time the pressure of the atmosphere irrespective of any pressure manually brought to bear against the door. For the construction and mode of operation of the device we must refer our readers to the drawings and specification.

17,534.—HINGES: *W. V. Leonard.*—This invention relates to an improved form of hinge or connexion for boxes, doors, and other purposes. The hinge is formed from two strips of metal or other material, bent or shaped into such a form and so situated that one part engages with the other, and can be turned over on it without becoming disengaged. When the hinges are to be connected together, one is slidden into the other from one end, thereby causing the bent edges to engage with each other, the hinge being disconnected by simply sliding the two sections apart. As applied to tin or other metal boxes, the back to which the lid is to be attached is bent over at the top, and the back of the lid is also bent into a corresponding shape, so that one part may be slidden into the other. In the case of wooden boxes, doors, &c., the hinges are preferably separate, and are screwed or otherwise fixed in position.

17,402.—SASH-BALANCES: *J. W. Sheppard.*—This invention relates to that class of sash-balances in which the spring drums for the suspending tapes or bands are placed in the upper part of the casing of the window over the middle of the sashes. Its object is mainly to reduce the number of parts usually employed for balancing or suspending the sashes and the expense in manufacturing the device, and consists in an improvement of the parts and the arrangement thereof.

NEW APPLICATIONS FOR LETTERS PATENT.

November 28.—21,721, R. Dampier, Trapping, Ventilating, and Inspecting Sewer and Drain Pipes in Houses, &c.

November 29.—21,747, J. Holgate, Attachment for Doors and French Windows, and their Frames, in order to prevent draughts and exclude dust.—21,781, J. Drew, Office-door Indicator.—21,784, J. English, Panelling applicable for Mural and other Decorative Purposes.—21,810, C. Casalonga, Heating Rooms and other Spaces.—21,820, R. Elsdon, Circular and other Saws.—21,822, J. Jones and R. Williams, Furniture and Pivotted Window-sashes, part of which is applicable to sliding sashes and doors.—21,835, W. Ingram, Valves for Cisterns, &c.

November 30.—21,839, H. Leggott, Firegrates.—21,847, W. Wilson, Constructing the Piers and Arches of Viaducts.—21,851, J. Ferguson, Fireproof Building Construction.—21,853, G. Warsop, Hinges for Doors, &c.—21,882, W. Nixon and H. Sheets, Device for Protecting Doors from the Weather.—21,833, F. Lee, Wood-working Machine.—21,890, E. Kemp, Wood-turning Lathe.—21,891, F. Allison, Window-sash-fasteners.—21,911, E. Ward, Syphonic Flush Cisterns.—21,932, J. Stutley, Composition Paint.

December 1.—21,958, R. Smillie and W. Wallace, Steam and Water Pipes.—21,960, J. Crosthwaite, Rainwater Pipes.—22,027, D. Murrow, Window and other Sashes.—22,036, W. and E. Freeman, Water-closets.—22,030.—C. Stevens, Securing Doors, French Windows, &c.

December 2.—20,055, J. Hilton and J. Rostron, Imitation Marble and Granite Slabs or Blocks.—22,098, F. Crane, Paints and Driers.—22,104, H. Mardon, Drying-sheds and Kilns for Bricks, Tiles, &c.—22,120, J. Taylor, Bricks.

December 3.—22,169, A. Franklin, Appliance for Use in Glass-cutting, whereby an ordinary glazier's diamond may be employed for cutting glass in circles of any required size.

PROVISIONAL SPECIFICATIONS ACCEPTED.

15,165, W. Wood and H. Hobden, Disinfecting Water-closets, Drains, Sewers, &c.—18,042, J. Peebles, Self-locking Window-sash-fastener.—19,304, J. Kirkman, Waste-water Closets.—19,389, J. Day, Combined Apparatus for overflow and quick flow waste from Baths, Lavatories, Sinks, &c.—19,397, F. Windham and P. Everitt, Automatically producing Hygienic Spray in Water-closets or Urinals.—19,433, A. Dawes and J. Mason, Fastenings for Cupboard Doors, French Windows, &c.—19,521, W. Hartmann, Metal-cutting Saw.—19,941, J. Pethick, Water-closets.—20,357, T. Barber, Tool and Holder for Boring Angular Holes.—

20,652, J. Dawson, Hand-working Planes for Carpenters, Cabinet-makers, Joiners, &c.—20,891, R. Matthews and J. Noad, White-lead and Coloured Pigments.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

1,514, W. Thompson, Grinding Tools. — 1,942- S. Renschel, Fastening Devices for Handles for Furniture, Drawers, &c.—2,003, R. Esplin, Hinges.—13,232, C. Baumgartel, Water-closet Basins.—17,014, J. Reekie, Fixing Water-closets.—19,433, H. Dawes and J. Mason, Fastening for Cupboard Doors, French Windows, &c.—19,604, H. Fuller, Plumb Bobs.—19,813, O. Böklen, Cement or Cement-mortar.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

DECEMBER 5.—By *Waterer & Sons*: An enclosure of f. meadow land, near Woking, about 5 acres. 215*l.*; f. nursery ground, 14 a. 1 r. 21 p., r. 57*l.*, 850*l.*; two f. cottages with gardens, 200*l.*; an enclosure of f. land, 1 a. 0 r. 20 p., 95*l.*

DECEMBER 6.—By *J. G. Ponder*: 56 and 58, Ellesmere-rd., Old Ford, f., 870*l.*; 141, Shepperton-st., New North-rd., u.t. 17 yrs., g.r. 6*l.*, r. 38*l.*, 135*l.*—By *Ventom, Bull, & Cooper*: 14A, Kilburn-sq., Kilburn, u.t. 30 yrs., g.r. 7*l.*, r. 40*l.*, 270*l.*; "Clifton House," Kilburn-sq., u.t. 57 yrs., g.r. 10*l.*, r. 50*l.*, 360*l.*; "Fairlight House," u.t. 57 yrs., g.r. 10*l.*, r. 50*l.*, 420*l.*—By *H. Hooper*: 2, 4, and 5, Mentone-rd., Highbury, u.t. 67 yrs., g.r. 22*l.* 10s., r. 120*l.*, 1,050*l.*

DECEMBER 7.—By *G. A. Wilkinson & Son*: The Erection known as "Whitehall Court," Whitehall, u.t. 85 yrs., g.r. 9,000*l.*, sold before auction.—By *Nicholson & Son*: 87 to 93 (odd), Portobello-rd., Notting Hill, f., r. 156*l.*, 1,670*l.*—By *Protheroe & Morris*: 3, Hallsville-rd., Canning Town, f., r. 26*l.*, 425*l.*—By *F. Jolly & Co.*: 2, Navarino-rd., Hackney, u.t. 53 yrs., no g.r., 67*0l.*

DECEMBER 8.—By *C. C. & T. Moore*: F.g.r. of 15*l.*, Canal-rd., &c., Mile End, reversion in 15 yrs., 1,870*l.*; 122 and 124, Skidmore-st., u.t. 15 yrs., g.r. 4*l.*, r. 46*l.*, 230*l.*; 3, Southgate-rd., Kingsland, u.t. 25 yrs., g r, 12*l.*, r. 50*l.*, 280*l.*—By *H. Donaldson*: 45 and 46, Regents-row, Haggerston, u.t. 53 yrs., g.r. 5*l.* 10s., 470*l.*; 35 and 37, Suffolk-rd., u.t. 53 yrs., g.r. 6*l.*, 495*l.*; 2, Cleveland-rd., Kingsland, u.t. 60 yrs., g.r. 5*l.* 5s., r. 36*l.*, 370*l.*—By *Newbon & Co.*: 14, Duke-st., Spitalfields, f., r. 20*l.* 45*l.*; 1 and 2, Knighton-cottages, Clapton, and a plot of land, u.t. 53 yrs., gr. 15*l.* 560*l.*; 23, Bryantwood-rd., Drayton Pk., u.t. 72 yrs., g.r. 6*l.* 10s., r. 38*l.*, 400*l.*; 6, Chadwell-st., St. John-street-rd., u.t. 20 yrs., g.r. 13*l.*, 220*l.*; 79, Hanley-rd., Stroud Green, u.t. 76 yrs., g.r. 7*l.* 7s., r. 23*5l.*; 29, Barnsbury Pk., Islington, u.t. 17 yrs., g.r. 5*l.*, r. 38*l.*, 200*l.*—By *Farebrother, Ellis, & Co.*: "The St. John's National Schools," The Broadway, Walham Green, f., area 10,200 ft., 9,400*l.*—By *Stimson & Sons*: 1 to 4, Portland-pl., Peckham, f., 1,910*l.*; 11, Bell's Garden-rd., u.t. 70 yrs., g.r. 4*l.*, 100*l.*; 36 and 38, Chadwick-rd., u.t. 77 yrs., g.r. 9*l.*, 375*l.*; 61 and 63, Rodney-rd., Walworth; 1, Chatham-st.; and a l.g.r. of 8*l.*, u.t. 69 yrs., g.r. 30*l.*, 600*l.*; 8, Barmore-st., Battersea, u.t. 64 yrs., g.r. 5*l.*, 105*l.*; a plot of land, Hindman's-rd., Dulwich, f., 55*l.*; 211 and 213, Lynton-rd., Bermondsey, u.t. 56 yrs., g.r. 10*l.*, 400*l.*; 40, Alma-rd., u.t. 37 yrs., g.r. 1*l.* 19s., 250*l.*

DECEMBER 9.—By *W. Bradley*: "Hanover House," "Holland Lodge," and "Heathside," Eltham-rd., Lee, u.t. 72 yrs., g.r. 12*l.* 3s., 1,650*l.*—By *J. T. Ayton*: 17 and 19, Langdale-st., St. George's-in-East, and 1, 2, and 3, Langdale-ct., u.t. 9 yrs., g.r. 11*l.*, 120*l.*—By *W. B. Hallett*: Freehold land, Bushey, Herts, 9 a. 0r. 3p., 1,600*l.*; No. 17, Finsbury Pk.-rd., u.t. 75 yrs., g.r. 7*l.* 17s. 6d., 650*l.*

[Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold: l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.

Greenheart, B.G. ton	9/0/0	0/0/0
Teak, H.I... load	9/10/0	15/0/0
Sequoia, U.S.ft.cu.	2/4	2/0
Ash, Canada load	2/10/0	4/0/0
Birch, do.	3/5/0	4/10/0
Elm, do.	3/10/0	4/15/0
Fir, Dantzic, &c.	1/10/0	3/10/0
Oak, do.	3/0/0	5/5/0
Canada	5/10/0	7/0/0
Pine, Canada red	2/10/0	3/10/0
Do, yellow	2/10/0	5/0/0
Lath, D'ntzic, fath	5/0/0	6/0/0
St. Petersburg	5/0 0	7/0 0
Deals, Finland 2nd & 1st std 100	7/10/0	10.0.0
Do, 4th & 3rd..	7/10/0	8/0/0
Do, Riga	6/10.0	8/0/0
St. Petersburg, 1st yellow ..	10/10/0	14/10/0
Do. 2nd yellow	8/10/0	9/10/0
Do. white	7/10/0	9/10/0
Swedish	7/10/6	16/0/0
White Sea	8/10/0	17/0/0
Canada, Pine 1st	21/0/0	27/10/0
Do. do. 2nd....	15/0/6	17/0/0
Do. do. 3rd, &c.	7/10/0	10/0/0
Do. Spruce, 1st	8/10/6	11/0/0
Do. do. 3rd & 2nd.....	6/10 0	8/0/0
New Brunswick	6/10/0	7/10/0
Battens, all kinds	3/10/6	15 10 0
Flooring Boards, sq., 1 in. prep. 1st	0/8/6	0/14/0
Do. 2nd.....	0/7/0	0/10/0
Other qualities	0/3/6	0/7/6
Cedar, Cuba ..ft.	/3½	/4½
Honduras, &c.	/3½	/4½
Mahogany, Cuba.	/4½	/6½
St. Domingo, cargo av	/4	2/0
Mexican do. do	/4	/5
Tobasco do. do	/4½	/7
Honduras do...	/5	/6½
Box, Turkey ton	4/0/0	13/0/0
Lens, Rio.....	16/0/0	20/0/0
Bahia	9 0/0	13/0/0
Satin, St. Domingo ...ft.	0/0/6	0/1/3
Porto Rico	0/0/7	0/1/6

TIMBER (*continued*).

Walnut, Italian..	0 0/3½	0/0/7

METALS.

IRON—Pig, in Scotland .....ton	2/1/8	0/0/0
Bar, Welsh, in London.....	5/17/6	6/0/0
Do. do. at works in Wales	5/7/6	5/10/0
Do. Staffordshire, in London	6/5/6	6/15/0
COPPER—British, cake and ingot	51/0/0	51/10 0
Best selected ..	52/0/0	52/10/0
Sheets, strong..	60/0/0	0/0.0
Chili, bars	47/5/0	47/12 6
YELLOW METAL lb.	0/0/5¾	0 0/5¾
LEAD—Pig, Spanish ....ton	9/16/3	9/17/6
English, com. brands	10/0/0	0/0/0
Sheet, English, 3 lbs. per sq. ft. and upwards ..	11/5/6	0.0.0
Pipe	11/15/0	0/0/0
ZINC—English sheet .....ton	22/10/0	0/0.0
Vieille Montagne.....	23/0/0	0 0.0
TIN—Straits	93/0/0	92/10/0
Australian	93/10/0	94 0 0
English Ingots.	95/0 0	96 0 0
Banca	93/0/0	93/5/0
Billiton	92/0/0	92/10/0

OILS.

Linseed .....ton	18/5/0	0.0.0
Cocoanut, Cochin	25/10.0	0/0/0
Do. Ceylon	23/10/0	23/15 0
Palm, Lagos	26/10/0	0/0 0
Rapeseed, English pale	24/15/0	25/0/0
Do. brown	23/5/0	23/10/0
Cottonseed ref...	18/15/0	0/0/0
Oleine	20/10/0	21/0/0
Lubricating, U.S.	4/0/6	5/0/0
Do. refined	5/10/0	12/0/0
TAR—Stockholm barrel	0/17.6	0/18/6
Archangel	0/12/6	0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 12 *noon on Thursdays.*]

BEERCROCOMBE (Somerset).—For proposed rectory house in the parish of Beercrocombe, Somerset. Mr. J. Houghton Spencer, architect, Taunton:—

Fowler & Stickland....	£1,660	0	
G. H. Pollard	1,267	0	
A. Poole	1,220	0	
H. W. Pollard	£1,194	0	
Channing & Musgrove .	1,160	0	
J. Morse	1,119	10	

BELFAST.—For the erection of a fire-brigade station, Chichester-street, for the Police Committee. Mr. J. C. Bretland, City Surveyor, architect, Belfast:—

A. Murdock	£8,331	0	0
McLaughlin & Harvey	6,918	1	2
H. & J. Martin, Ltd.	6,874	3	0
Campbell & Lowry..	6,845	0	0
Fitzpatrick Bros., Ltd.....	6,754	0	0
Robert Corry	£6,752	0	0
J. & W. Stewart....	6,734	0	0
Jno. Lowry & Son ..	6,675	0	0
James Henry	6,601	0	0
W. J. Campbell & Son, Belfast*	6,434	0	0

* Accepted.

BURNLEY (Lancs.)—Accepted for the works in connexion with the erection of a ladies' bath, adjoining the existing Public Baths in Bath-street, for the Town Council. Mr. F. S. Button, Borough Surveyor, Town Hall, Burnley. Quantities supplied:—

Masons, &c.—Geo. Read & Son	£285 1 10
Carpenter and Joiners—J. & S. Atherton.....	167 17 1
Plumbers—R. Roberts	98 10 0
Painters—Jno. Smith	16 17 11

[All of Burnley.]

CARDIFF.—For the supply of about 4'0 wrought-iron tree guards, for the Corporation. Mr. W. Harpur, C.E., Borough Surveyor, Town Hall, Cardiff:—

	Each.				Each.		
T. W. Dillon & Co.	£1	7	6	J. C. Coleman	£0	12	6
Hills Bros.	1	5	6	W. Blakemore & Co ...	0	12	5
The Rock Iron, Steel, and Brass Foundry ..	1	5	0	Bayliss, Jones, & Bayliss	0	12	0
R. Dawson	1	4	6	G. Krte & Co.	0	11	9
T. Spittle, Limited	1	4	0	J. John & Sons	0	11	3
South Wales Engineering Co.	1	1	0	D. Rowell & Co.	0	10	6
E. Warrell & Co.	0	17	3	Economic Fencing Co.	0	10	0
The Globe Foundry Co.	0	15	5	J. Chapman	0	9	9
Abercarne Engineering Co.	0	15	0	Cross Bros.	0	9	9
Bruce & Still	0	14	8	Jukes & Co.....	0	9	9
T. Wills	0	14	0	W. Hayward & Son	0	9	9
J. & G. Thomas.....	0	13	0	J. Priest & Co.	0	9	6
W. A. Baker	0	12	10	Johnson & Co.	0	9	3
				W. T. Burridge.....	0	9	0
				E. J. Raybould & Co...	0	9	0
				Walker Bros., Walsall*	0	8	5!

* Accepted.

CARDIFF.—For forming, metalling, paving, &c., Plasterton-gardens, for the Corporation. Mr. W. Harpur, C.E., Borough Surveyor, Town Hall, Cardiff:—

J. C. Pearson	£341	9	6
James Rich	280	11	2
Ellis & Davies.....	£274	3	0

[All of Cardiff.]

DEVONPORT.—For the erection of fifty-five houses and sewerage works, for the Dockyard Workmen's Dwellings Company. Mr. W. N. Richards, architect, 29, St. Aubyn-street, Devonport. Quantities by Mr. G. Bryant, 31, Staddon-terrace, Plymouth:—

S. Perkins	£18,942	16	6
J. Julian.....	17,500	0	0
A. N. Coles	16 824	0	0
Cole & Fox.....	16,764	4	2
P. Blowey	16 750	0	0
J. Crocker.....	16,479	0	6
A. R. Lethbridge & Son	16,065	0	0
Williams & Westlake	15,981	18	0
W. Trevena	£15,750	0	0
J. Partridge.....	15,645	0	0
Wakeham Bros....	15,227	17	2
A. Andrews.....	14,965	0	0
T. May	14,817	0	0
Reed, Blight & Co., Limited.....	14,744	10	0
Kerswill	14,528	0	0
S. Roberts	14,307	4	0
G. Shellabear	12,280	0	0

EASTBOURNE.—For the erection of porches, &c., at the Infirmary, for the Guardians of the Eastbourne Union. Mr. F. G. Cooke, architect, 3, Hyde-gardens, Eastbourne:—

E. Cornwell & Son....	£166	15	6
Chas. Peerless Dennis	154	0	0
W. & J. Newman*....	£142	10	0

* Accepted.

[All of Eastbourne.]

EASTBOURNE.—For additions to 4, Gildredge-road, Eastbourne, for Mr. B. Cliff. Mr. F. G. Cooke, architect, 3, Hyde-gardens, Eastbourne:—

James Wood.....	£799	2	0
W. Backhurst	785	0	0
James Peerless.....	769	0	0
E. Cornwell & Son	768	0	0
Miller & Selmes	£764	8	6
Joseph Martin	748	0	0
Mark Martin*	742	0	0

* Accepted.

[All of Eastbourne.]

EAST GRINSTEAD.—For the erection of new premises at East Grinstead, Sussex, for the Capital and Counties Bank. Messrs. J. D. & H. E. Mathews, architects, 11, Dowgate-hill, London, E.C.:—

Colls & Son	£3,340	0	0
Rice.....	3,210	15	10
Carrick	3,150	0	0
Tooth, East Grinstead*	£2,800	0	0

* Accepted.

EPPING.—For sewerage and sewerage-disposal works, Chingford, for the Rural Sanitary Authority. Mr. E. Egan, Engineer, Rural Sanitary Authority's Offices, Loughton. Quantities by the Engineer:—

John Band	£7,460		
W. Botterill.....	6,564		
J. Neave	6 436		
W. & C. French	5,885		
B. Cooke & Co.....	£5 850		
J. E. Blomfield	5,767		
S. Hipwell.....	5,450		
Geo. Bell, Tottenham*....	5,390		

* Accepted.

EXETER.—For the supply and delivery of 100 tons of cast-iron turned and bored pipes, for the Corporation. Mr. Donald Cameron, City Surveyor, 18, Bedford-circus, Exeter:—

Kirk & Horsfield	£750	0	
Newton, Chambers, & Co.	575	0	
Demerel & Co.	562	10	
John Romans & Sons	552	10	
Maclaren & Co.....	550	0	
Hughes & Gotto	545	0	
Laidlaw & Son	532	10	
Clay Cross Co.	525	0	
Wallis Bros.	525	0	
Jordan & Sons	512	10	
Horsley	510	0	
Cochrane & Co.....	500	0	
J. & S. Roberts, Limited.	500	0	
Smith, Patterson, & Co., Limited..	490	0	
George Bond, Staveley Iron Co.	£487	10	
Stanton Iron Works	487	10	
Thomas Spittle, Limited	485	0	
Biggs, Wall, & Co.	482	10	
Macleod & Co.	477	10	
Shaw & McInnes	475	0	
Newcombe & Co.	475	0	
Watson, Gow, & Co.	473	15	
Firmstone Bros., Lays Iron Foundry, near Stourbridge*	450	0	
J. Walker	442	10	
James Ritchie	440	0	

* Accepted.

GREAT CROSBY (Lancs.).—For the supply of cast-iron gas-mains, coated with Angus Smith's solution, for the Local Board. Mr. Watkin Hall, Surveyor:—

Kirk & Horsfield	£136 0 0
The Stanton Iron Company.....	108 18 0
The Butterley Iron Company	88 0 0
The Clay Cross Company	76 16 8
C. E. Firmstone & Bros., Brierley-hill, Stourbridge (accepted)	73 19 10
James Oakes & Co.	73 15 6

[Other tenders were submitted which did not comply with the conditions.]

HYTHE.—For the construction of 2,310 yards of 18-in. sewer, &c., for the Town Council. Mr. E. S. Wilks, Surveyor, 2, Douglas-avenue, Hythe, Kent:—

B. Cooke & Co.	£4,284	0	
G. Couley.....	3,917	0	
J. J. Jeal	3,397	13	
John Neave.....	£3,390	0	
Rackham & Bentham ..	3,294	0	
Edward Palmer	3,189		

LLANTRISSANT (Glamorgan).—For the construction of main sewers, tanks, &c., and extending a sewer, Beddan, for the Pontypridd Rural Sanitary Authority. Mr. Gomer S. Morgan, Surveyor, Llantwit-Vardre, Pontypridd. Quantities by the Surveyor:—

Llantrissant Sewer.

John & John.....	£291	4	11
Chas. H. Cooksley	289	19	10
William Davies	289	0	0
Lloyd & Powell	269	9	4
John Mackay	239	18	8
Lewis & Dyer	£235	11	0
Meshach Williams....	227	1	10
John Morgan, Pontyclun*	195	15	4

* Accepted.

Beddan Sewer.

John Mackay	109	0	4
Meshach Williams....	101	9	4
Lewis & Dyer	90	8	6
John Morgan, Pontyclun*	76	9	4

* Accepted.

LONDON.—For making-up and paving Oakbury, Perkbury, Prothero roads, and Lettice-street, for the Fulham Vestry. Mr. W. Sykes, Surveyor, Vestry Offices, Fulham:—

Oakbury-road.

	Road-way.	York.	Adamant.	Victoria.	Stuart's.	Imperial.
	£	£	£	£	£	£
Tomes & Wimpey.	389 ..	197 10 ..	143 0 ..	— ..	— ..	—
Rogers & Co.....	413 .	193 0 ..	— ..	— ..	— ..	—
Nowell & Robson..	387 ..	— ..	143 0 ..	— ..	— ..	—
J. Mears	350 ..	— ..	— ..	— ..	— ..	—
E. Parry.....	445 ..	220 0 ..	— ..	— ..	— ..	—
Mowlem & Co.....	407 ..	204 0 ..	179 0 ..	189 ..	179 ..	169
H. J. Greenham ..	400 ..	— ..	— ..	— ..	— ..	—
Imperial Stone Co.	— ..	— ..	— ..	— ..	— ..	154

Perkbury-road.

Tomes & Wimpey.	169 ..	72 10 ..	52 10 ..	— ..	— ..	—
Rogers & Co.....	153 ..	72 0 ..	— ..	— ..	— ..	—
Nowell & Robson..	156 ..	— ..	52 0 ..	— ..	— ..	—
J. Mears.....	140 ..	— ..	— ..	— ..	— ..	—
E. Parry.....	170 ..	87 ..	— ..	— ..	— ..	—
Mowlem & Co.....	144 ..	75 0 ..	66 0 ..	69 ..	66 ..	62
H. J. Greenham ..	175 ..	— ..	— ..	— ..	— ..	—
Imperial Stone Co.	— ..	— ..	— ..	— ..	— ..	55

Prothero-road. Section II.

Tomes & Wimpey.	499 ..	255 0 ..	185 0 ..	— ..	— ..	—
Rogers & Co.....	450 ..	260 0 ..	— ..	— ..	— ..	—
Nowell & Robson..	463 ..	— ..	183 0 ..	— ..	— ..	—
J. Mears.....	388 ..	— ..	— ..	— ..	— ..	—
E. Parry.....	455 ..	275 0 ..	— ..	— ..	— ..	—
Mowlem & Co.....	480 ..	272 0 ..	247 0 ..	259 ..	247 ..	234
H. J. Greenham ..	380 ..	— ..	— ..	— ..	— ..	—
Imperial Stone Co.	— ..	— ..	— ..	— ..	— ..	199

Lettice-street. Section II.

Tomes & Wimpey.	356 ..	153 10 ..	112 0 ..	— ..	— ..	—
Rogers & Co.....	430 ..	157 0 ..	— ..	— ..	— ..	—
Nowell & Robson..	363 ..	— ..	112 0 ..	— ..	— ..	—
J. Mears.....	335 ..	— ..	— ..	— ..	— ..	—
E. Parry.....	390 ..	185 0 ..	— ..	— ..	— ..	—
Mowlem & Co.....	434 ..	165 0 ..	150 0 ..	158 ..	150 ..	143
H. J. Greenham ..	360 ..	— ..	— ..	— ..	— ..	—
Imperial Stone Co.	— ..	— ..	— ..	— ..	— ..	122

LONDON.—For rebuilding 3, St. Martin's street, Leicester-square, W.C., for Mr. Israel Britten. Mr. W. M. Brutton, architect, 171, Queen Victoria-street, E.C.:—

Johnson & Manners	£1,749		
J. & J. Feast.....	1,584		
W. Smith	1,300		
Lloyd & Co.	1,275		
Edwards & Medway	1,267		
W. Rowe.....	£1,195		
Pritchard & Renwick	1,174		
A. H. Tout	1,165		
G. S. Archer, Finsbury* ..	995		

* Accepted.

LONDON.—For rebuilding "The Crystal" public-house, Rotherhithe New-road, exclusive of fittings, and dwelling-house adjoining 57, Old-road, Bermondsey, S.E., for Mr. George Evans. Mr. W. M. Brutton, architect, 171, Queen Victoria-street, E.C.:—

	Portland.		Bath.
H. Burman & Sons.....	£3,564	.....	£3,474
W. Smith	3,155	.....	3,080
Hart Bros.	3,092	.....	2,999
Pritchard & Renwick.....	3,078	.....	2,950
W. Rowe.....	3,050	.....	2,780
G. Godson & Sons.....	2,973	.....	—
L. Whitehead & Co.....	2,940	.....	2,852
J. Allen & Sons.....	2,867	.....	2,687
H. L. Holloway.....	2,786	.....	2,696
Edwards & Medway.....	2,786	.....	2,600
G. S. Archer	2,650	.....	2,525

LONDON.—For alterations to the "Tiger" beerhouse, Walworth-road, S.E., for Mr. Bigoll. Mr. W. M. Brutton, architect, 171, Queen Victoria-street, E.C.:—

Pritchard & Renwick	£128		
B. Crook	125		
H. Babbs, Walworth*	£97		

* Accepted.

LONDON.—For the rebuilding of Nos. 8 and 9, Great St. Helen's E.C. Mr. Delissa Joseph, architect, 17 and 18, Basinghall-street, E.C.:—

Bywaters & Sons	£10,750 0 0

LONDON.—For rebuilding No. 3, Sydney-street, Bethnal Green, for Mr. William M Hodges. Mr. Joseph G. Needham, architect, 11, Powerscroft-road, Clapton, N.E.:—

N. Thomas	£630		
S. W. Hawkings.....	583		
Banes.....	490		
Coulsell Bros.	487		
Worden & Easton	£485		
E. Lancaster	465		
Robt. Cooper*.....	435		

* Accepted.

[Architect's estimate, £475.]

LONDON.—For the erection and completion of a public underground convenience for men, Harrow-road, for the Vestry of Paddington. Mr. Geo. Weston, Engineer and Surveyor, Vestry Hall, Harrow-road. No quantities:—

G. Jennings.....	£1,305 0 0
J. Bentley	1,270 0 0
Neave & Son, Marylands-road, Paddington*	1,124 0 0

* Accepted.

MANCHESTER.—For the erection of a temperance hotel, Deansgate, Manchester, for the Manchester Temperance Hotels Company, Limited. Messrs. Moffat & Bentley, architects, Whitehaven. Quantities by Messrs. W. J. Watts & Son, Manchester:—

J. Byrom.....	£21,150		
Young, Tinker, & Young	23,613		
Bullivant & Son	20,509		
R. Whitell	20,392		
Wm. Thorpe	20,250		
Wm. Brown & Son	19,880		
Wilson & Toft.....	19,190		
Wm. Southern & Sons....	£18,710		
S. Megarity & Co.....	18 650		
Burgess & Gait	18,340		
Robt. Neill & Sons	18,290		
Lister, McCartney, & Lister, Cockermouth*..	16,974		

* Accepted subject to reduction.

PENARTH.—For the erection of steam laundry buildings, stables, &c., for the Penarth Steam Laundry Company, Limited. Mr. R. Pickwell, architect, Bank-buildings, Cardiff. Quantities by the architect:—

Jenkins & Arnold ..	£1,525	0	0
D. C. Jones	1,480	0	0
Newby & Co.....	1,406	15	11
E. T. Hatherly.....	1,397	0	0
T. Bevan	1,374	0	0
F. Ashley	1,328	0	0
E. Richards	1,299	0	0
J. Jones	£1,297	0	0
D. G. Price	1,275	0	0
F. Small.....	1,206	0	0
H. Tape	1,177	0	0
Morgan & Roberts, Newport*	1,130	0	0

* Accepted.

PRESTON.—For the construction of earthenware-pipe sewer, settling-tanks, and filters, Ribchester, for the Union Rural Sanitary Authority. Mr. J. J. Myres, Engineer, 15, Chapel-street, Preston. Quantities by the Engineer:—

Thos. Battersby	£525		
Jas Orrell.....	465		
J. Hardiker	443		
J. Sharp'es	£440		
Carter Brothers, Preston*..	400		

* Accepted conditionally.

RICHMOND (Surrey).—For the carrying out of certain works in laying-out and draining new cemetery, for the Town Council. Mr. E. J. Lovegrove, C.E., Borough Surveyor, Lower Mortlake-road, Richmond:—

W. J. Botterill	£4,747		
James Hayward	4,557		
Tomes & Wimpey	4,221		
George Bell	3,927		
J. Jackson.....	3,890		
E. Iles.....	£3,875		
James Bowles	3,500		
Neave & Son.....	3,490		
R. K. Facey	3 445		
J. E. Broderick, Richmond*	3,365		

* Accepted.

SALISBURY.—For the erection of a boot-factory and offices, for Messrs. Moore Bros. Mr. Alfred C. Bothams, architect, Salisbury. Quantities by the architect:—

H. Bull	£9,880	Sims	£8,640
Cockerell	9,780	Kimberly	8,500
Sanders	9,480	Musselwhite	8,397
Becks	9,223	Reed, Blight, & Co.	8,3 5
Light	9,219	Morgan & Co.	8,334
Dawkins	9,199	Longley	8,250
Young Bros.	9,100	Wort & Way	8,239
Cowlen	9,087	Webb & Co.	7,970
Quick	9,000	J. W. Roe & Co., Southampton*	7,595
Hale	8,946		
Hall	8,890		

* Accepted.

SHIRLEY (Hants).—For paving, channelling, &c., Shirley and Millbrook roads, for the Local Board. Mr. H. J. Weston, A.M.Inst. C.E., Surveyor, Local Board Offices, Shirley, Hants:—

F. Osman	£190	0	0
J. W. Roe, & Co., Southampton (accepted)	185	0	0

[Surveyor's estimate, £ 89.]

SOUTHEND.—For the erection of residence at Southend-on-Sea, for Mr. J. Brown. Mr. Edward Wright, architect, Southend:—

Chapman	£1,535	Baker & Wiseman	£1,165
Rodwell	1,259	Edmunds	1,087
Darke & Son	1,197	Dupont	1,041

SOYLAND (near Halifax).—Accepted for taking down "Lower Burnt Moor Farmstead," and building new farmhouse, barn, stable, &c., forming approach-road and building fence walling. Mr. T. L. Patchett, architect, Halifax:—

Excavator, Mason, and Bricklayer — Emanuel Riley, Rishworth (exclusive of old materials re-used)	£420	0	0
Carpenter and Joiner—Learoyd Whitely, Triangle	94	15	5
Plumber and Glazier (exclusive of water-supply). —Wm. Alderson, Luddenden	8	5	0
Slater and Plasterer—Thos. Alderson, Luddenden slating labour only)	25	0	0
Total	548	0	5

Estimated total cost, £700.]

STORNOWAY (N.B.).—Accepted for constructing, &c., portions of harbour works, for the Pier and Harbour Commissioners. Mr. Alexander Macdonald, Engineer, Stornoway Harbour, N.B. Quantities supplied:—

R. C. Brebner, Edinburgh	£1,600	0	0

SURBITON (Surrey).—For the erection of a pair of semi-detached villa residences in St. Andrew's-square, Surbiton. Mr. R. Lane Pearce, architect, 100c, Queen Victoria-street, E.C., and Surbiton:—

Brown & Co.	£1,333	A. Martin	£1,184
J. H. Jarvis	1,323		

TUDHOE (Durham).—Accepted for laying out, making roads, and other works at Burial Ground, for the Burial Board. Mr. J. Henry, architect, 11, North Bailey, Durham:—

W. & R. Blackett, Bishop Auckland	£1,127	6	0

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18. Oxford	June 4.	24. Truro	Nov. 5.
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R. L.—"Architect" (letters for publication must be authenticated by a name and address enclosed).—J. C. R.—F. W. R.—E. A. B. (thanks, but too small for insertion).—M. & S. (one list inserted; the other did not comply with our conditions).—G. S. (amounts should be given).—F. M. R. (if all the names had been sent we would have inserted the paragraph).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

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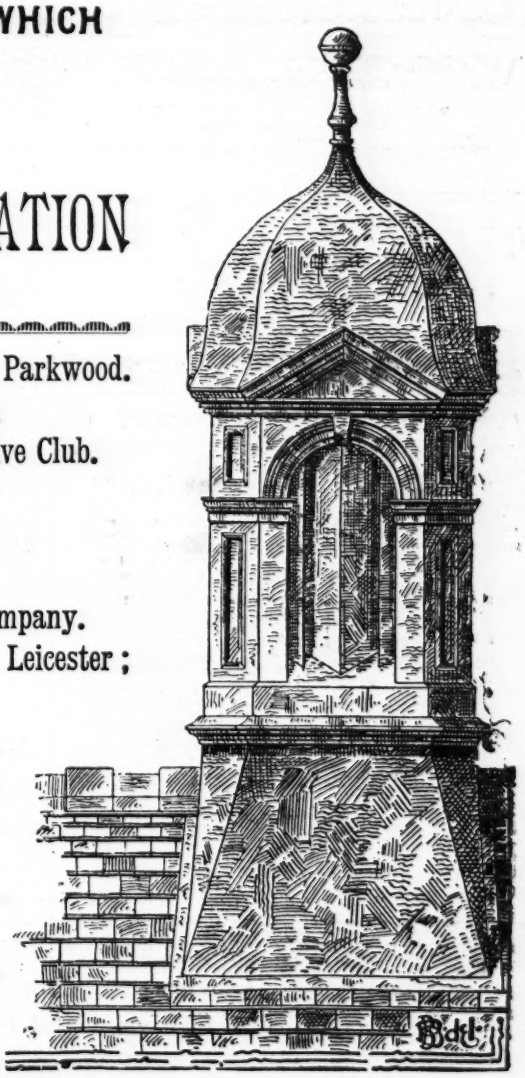

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2. Of what materials is Portland cement composed? Give a brief description of the process of manufacture. Describe the methods of testing.
3. Give sectional sketch of a 16-inch hollow wall, showing wall plate and foot of rafter for roof; show method for bonding. State what precautions are necessary during the building, and show foundations.
4. Describe in detail the materials to be used in, and the way to construct a brick sewer, at, say, a depth of 12 feet in bad ground, showing timbering, &c. Show by figured sketches the sections both of a circular sewer about 4 feet area internally, and of an egg-shape sewer of the same area under the above conditions.
5. Make sketches and explain the jointing of—
   (a) A stoneware drain.
   (b) A lead soil pipe.
   (c) Iron and stoneware pipes.
   (d) Lead and cast-iron pipes.
6. Explain the difference between wet and dry rot; show by sketches what precaution you would take to prevent rot at the ends of timbers which rests on the walls in the building.
   Describe in detail, and by sketches, the way to construct a house drain in bad ground, both as to materials and workmanship. How should it be tested before it is passed, and how can it be tested subsequently, if it is suspected of being imperfect? Give sketches to show how it should be ventilated.
8. Give sketches of good and bad forms of traps. Show by sketches how you would prevent syphoning of the traps where two w.c.'s discharge into the same soil pipe.
9. Give sketches of a lecture room 50 feet by 30 feet, and 20 feet high to the plate, with open timber roof at an angle of 45 degrees. Show the method of ventilation. State the number of persons that the room will accommodate sitting.
10. What are the rules now in force in London, as to building on a site that has been filled up with foul materials? Where are those rules set forth, and under the authority of what Act of Parliament? Give similar information with regard to the materials to be used in plastering.
11. Define a "habitable" room in a London basement and in an attic. State where the requirements are to be found set forth.

The names of the successful candidates are as follow:—

Abrams, H. J. S.	Martin, Robert.
Belcher, C. R.	Smith, Harry.
Foulger, Frank.	Star, W. F.
Herrin, John.	Strange, E. J.
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SURVEYORS' INSTITUTE and SANITARY INSTITUTE EXAMINATIONS.—CANDIDATES COACHED, Personally or by Correspondence. Practical lessons in quantity surveying (London system), estimating, and analysis of builders' prices. Saturday Land Surveying Class.—C. B. W. 87, Ireneroad, Parson's Green, S.W.

EXAMINATIONS.—Surveyors' Institution (Special) Civil Service Technical, Sanitary Institute, and Cooper's Hill entrance. Personally or by correspondence Successful system. Classes in surveying, levelling, and draughtsmanship. Sewerage and Drainage a speciality. Fees moderate and inclusive — Mr. CUNLIFFE, 108, High-street, Kensington, W.

CIVIL SERVICE COMMISSION. Preparation for the Exams. now advertised, and for the R.I.B.A. Exams. personally or by correspondence. Vacancy for one pupil in house. Several first places. Lectures shortly commence on materials, practice, and stresses.—G. A. T. MIDDLETON, 42, Bolingbroke-grove, S.W.

R.I.B.A. EXAMS.—Preparation personally or by correspondence. Moderate terms.—Apply, WILLIAM C. HOWGATE, A.R.I.B.A, 21, Parliament-street, Westminster, S.W.

PRIVATE LESSONS REQUIRED in ARCHITECTURE and BUILDING CONSTRUCTION, one or two evenings a week. West London.—Address, Box 198, Office of "The Builder."

QUANTITIES, &c. ELECTROGRAPHED equal to Lithography, at about half the cost. Technical accuracy. Send for specimen and prices. Quantities Box, 14 in. by 9 in. by 5 in. neat and strong drop front, at 2s. 6d. each; 6 for 12s. or made to order.—Plans copied, lithographed, coloured.—W. HARDAKER, Electrographer, 21, Cursitor-street, E.C.

ARCHITECT'S APPOINTMENT. — An ARCHITECT (in a large Provincial town), of 25 years' experience, and of good standing, is about to establish an Office in London, and is open to take an APPOINTMENT as ARCHITECT to an Estate or Corporation. His practice extends over the United Kingdom, and includes Public and Private Works of great variety. His work is careful, thorough, practical, and highly successful. Fullest information will be given as to character, style of work, and references to clients.—Box 200, Office of "The Builder."

AN ARCHITECT wishes TO LET his City Office, furnished, on second floor, 27, Walbrook. Small, but good light. Rent 28l. Or would be let unfurnished if desired.—PAXTON WATSON, 19, Craven-street, Strand.

OFFICES.—An ARCHITECT OFFERS a SHARE of his OFFICES to Architect, Engineer, or Surveyor. Splendid London address near Charing Cross. Inclusive terms 27l. per annum. References required.—Apply by letter to Box 193, Office of "The Builder."

PARTNERSHIP.—Gentleman wishes to take the working part in an ARCHITECTURAL PRACTICE. —Address, W. P. 930, Messrs. Deacon's, Leadenhall-street, E.C.

TO BUILDERS, CONTRACTORS, and OTHERS.—Owing to a dissolution of partnership, an exceptional opportunity occurs to acquire the HALF-SHARE in one of the best-known BUILDER & CONTRACTOR'S BUSINESSES in the South of England, established and in the hands of the same family over a century, and doing a very high-class, profitable, steady, and non-speculative trade. It is situate under an hour's rail of London, accessible to all parts, adjacent to a most important town. Also having works, steam saw-mills, &c. immediately adjoining, and siding to Railway Station, covering an area of two acres. Also lucrative brick works, which are optional. The premium required is very little more than half the value of the stock and plant. The Vendor finding the business much larger than he can manage, wishes to secure the collaboration of a good practical man, and therefore, virtually, a partner is asked for the very valuable goodwill.—Comprobation as to terms, returns, profits, &c. for many years past may be had upon application to the Vendor's Agent, Mr. F. PERKS, Dover House, 28, Dover-street, Piccadilly.

PURSUANT to an Order of the Chancery Division of the High Court of Justice made in the matter of the estate of Benjamin Looker, deceased, and in an action. Freeman v. Looker and another, 1892. L. No. 2952, the CREDITORS of BENJAMIN LOOKER, late of Kingston Hill, in the County of Surrey, Brick and Tile Manufacturer, who died on the 11th day of October, 1892, are on or before the 14th day of JANUARY, 1893, to send by post prepaid to PETER DE LANDE LONG, of the firm of Long & Gardiner, of 8, Lincoln's Inn-fields, in the county of London, the Solicitors for the Defendants, Kate Looker, Spinster, and Benjamin Walter Looker, the Administratrix and Administrator of the said deceased, their Christian and surnames, addresses, and descriptions, the full particulars of their claims, a statement of their accounts, and the nature of the securities (if any) held by them, or in default thereof they will be peremptorily excluded from the benefit of the said Order. Every creditor holding any security is to produce the same before Mr. Justice Kekewich, at his Chambers, the Royal Courts of Justice, Middlesex, on the 27th day of JANUARY, 1893, at TWELVE o'clock at noon, being the time appointed for adjudicating on the claims.

Dated this 10th day of December, 1892.

HENRY SMITH.
No. 8, Lincoln's Inn-fields London W.C
Solicitor for the Plaintiff, HENRY FREEMAN.

MEMORIAL to the late JAMES FOWLER, Esq. F.R.I.B.A.—It is proposed to ERECT a MEMORIAL to this eminent architect in his native town. Subscriptions towards this object may be paid into the Capital and Counties Bank, or Lincoln and Lindsey Bank, Louth Branches, or be promised to the Rev. E. L. GARDNER, Secretary (pro tem.), Louth, Lincolnshire.

CIVIL SERVICE COMMISSION. Forthcoming EXAMINATION, VALUER and SURVEYOR (Second Section) in the Valuation Office, Ireland, (21-28) 12th JANUARY, 1893.

The date specified is the latest at which applications can be received. They must be made on forms, to be obtained, with particulars, from the SECRETARY, Civil Service Commission, London, S.W.

CIVIL SERVICE COMMISSION. Forthcoming EXAMINATION, ASSISTANT SURVEYORS, Royal Engineer Civil Staff (21-30). 4th JANUARY, 1893. Technical training and qualifications necessary.

The date specified is the latest at which applications can be received. They must be made on forms to be obtained, with particulars, from the SECRETARY, Civil Service Commission, London, S.W.

INSPECTOR of SEWERS.

The Commissioners of Sewers of the City of London hereby give notice that they are about to APPOINT an ASSISTANT INSPECTOR of SEWERS. Aged 25 to 32.

Salary 175l.

Applications to be made in candidates' own handwriting, addressed to the undersigned, with copies of testimonials, on or before the 31st instant.

The person elected must give his whole time to the duties of the Office, and will be subject to annual election.

A general statement of the duties may be seen at this Office.

HENRY BLAKE,
Principal Clerk.

Sewers' Office, Guildhall,
December, 1892.

BOROUGH of PLYMOUTH.

WANTED, in the Sanitary Department of the Plymouth County Council, an ASSISTANT INSPECTOR of NUISANCES, at a salary to commence at 80l. per annum, rising 5l. per annum to the maximum of 110l.

Candidates must hold the certificate of the Sanitary Institute.

Applications, in writing, stating age (which must not exceed 35 years), accompanied by not more than three testimonials of recent date, to be addressed to the Medical Officer of Health, and endorsed "Application for Assistant Inspector of Nuisances," must be delivered to me not later than DECEMBER 28th, 1892.

Information as to duties, &c. can be obtained at the Office of the Chief Sanitary Inspector, Municipal Buildings, Plymouth.

B. M. WILLIAMS,
Medical Officer of Health.

Municipal Buildings, Plymouth,
December 9th, 1892.

THE BOARD of WORKS for the WANDSWORTH DISTRICT REQUIRE the services of a competent person, over 21 and under 30 years of age, to act as SURVEYOR'S ASSISTANT in the Parish of Wandsworth.

Applicants must be neat and expeditious draughtsmen, accurate surveyors and levellers, and have had experience in sewerage, drainage, street-paving, and improvement works, and the routine work of a Surveyor's Office.

Salary, 2l. 5s. per week, rising (subject to the order of the Board) by annual increments of 2s. 6d. per week to 3l.

The Board also REQUIRE the services of a competent person as SECOND ROAD FOREMAN in the Parish of Wandsworth, to superintend the making-up of new roads, the connexion of house drains with the sewer, to make plans of such connexions, and generally to assist.

Salary, 2l. per week, rising (subject to the order of the Board) by annual increments of 2s. per week to 2l. 10s.

The persons appointed will be required to devote the whole of their time to the duties of the Office.

Applications must be delivered at these Offices on or before MONDAY, the 2nd JANUARY next.

No application will be received unless it is made upon one of the printed forms issued from these Offices. Applications for forms should be accompanied by a stamped addressed envelope.

Canvassing members will disqualify candidates.

HENRY GEORGE HILLS,
Clerk to the Board.

East Hill, Wandsworth, S.W.
December 14th, 1892.

ASSISTANT.—WANTED, early in New Year, well qualified ASSISTANT in Architect's Office, London. Must understand classic detail and be a quick and trustworthy draughtsman —State terms to Box 270, Office of "The Builder."

REQUIRED, at once, TEMPORARY ARCHITECTURAL ASSISTANCE. Must be thoroughly competent.—Apply W. C. J. 32, Bedford-row, W.C.

ASSISTANT WANTED (Temporary, probably Permanent). Must have had good experience. Call with evidence of work if possible.—S. I. & S. 13, Phœnix-street, N.W.

ASSISTANT (High-class) WANTED, to ASSIST in an Architect's Office, on first-class Gothic work.—Apply, Box 261, Office of "The Builder."

ROAD SURVEYOR and SANITARY INSPECTOR (old established) is OPEN to ENGAGE well educated Young Man as PUPIL or ASSISTANT.—Address, Box 201, Office of "The Builder."

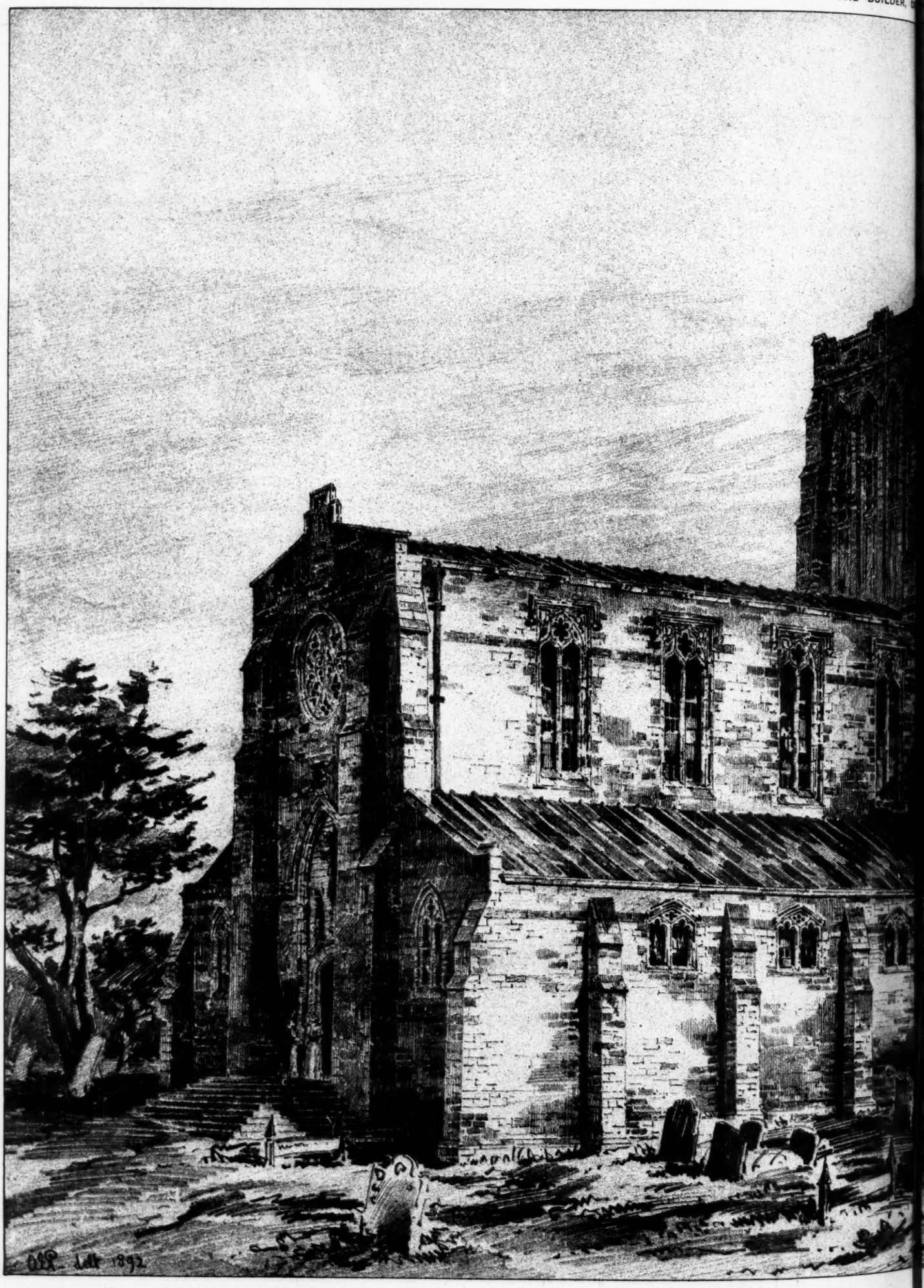
ARCHITECTURAL PUPIL WANTED, by an Architect and Surveyor with first-class City practice. Premium moderate. Pupil would have the personal attention of the Principal.—Apply by letter to Messrs. DEBENHAM & WALKER, Solicitors, 2, Gresham-buildings, Basinghall-street, E.C.

IMPROVER WANTED, in Office of Architect in the City. Must be well educated, and have some preliminary knowledge of Classic work. Good opportunity for seeing first-class work.—State particulars, Box 269, Office of "The Builder."

WANTED, in Measuring and Estimating department of London Builder's Office, experienced MAN. Must be well up in measuring from buildings and drawings.—State age, particulars of previous experience, and salary required, and if disengaged, to Box 266, Office of "The Builder."

BUILDER'S CLERK WANTED (with knowledge of estimating preferred).—Address, stating age, qualifications, salary required, and references, to THOMAS CROSSLEY, Builder, Bromley, Kent.

PRIME COST and GENERAL CLERK WANTED, in a London Builder's Office. Well up in the duties, and a neat and expeditious writer.—Apply, stating age, qualifications, references, and salary required, to Box 225, Office of "The Builder."



Royal Academy Exhibition, 1892.

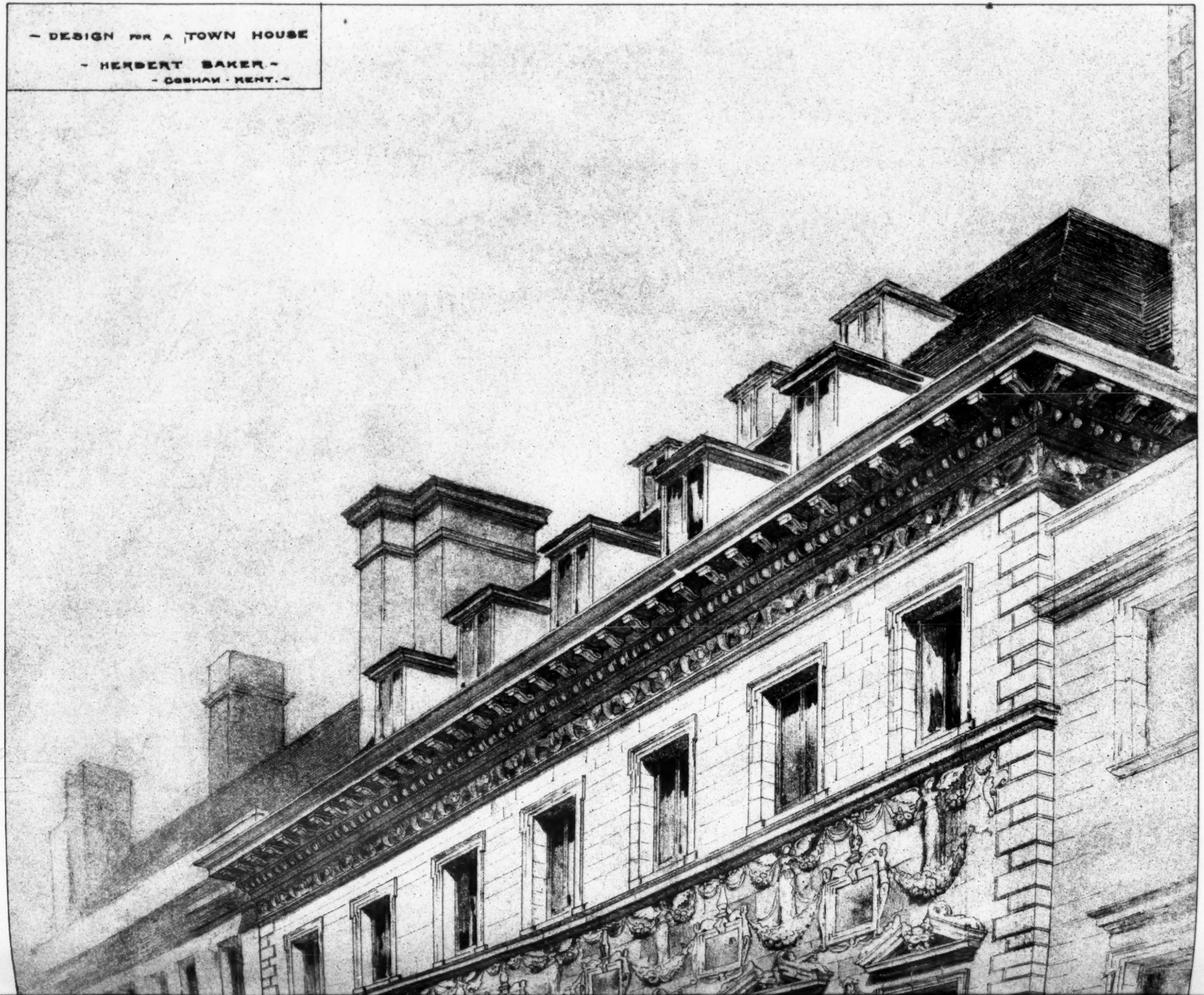
Design submitted in Competition for:
S. Luke's Church Winnington.
F. C. Eden. B.A. & J. L. Williams Archts

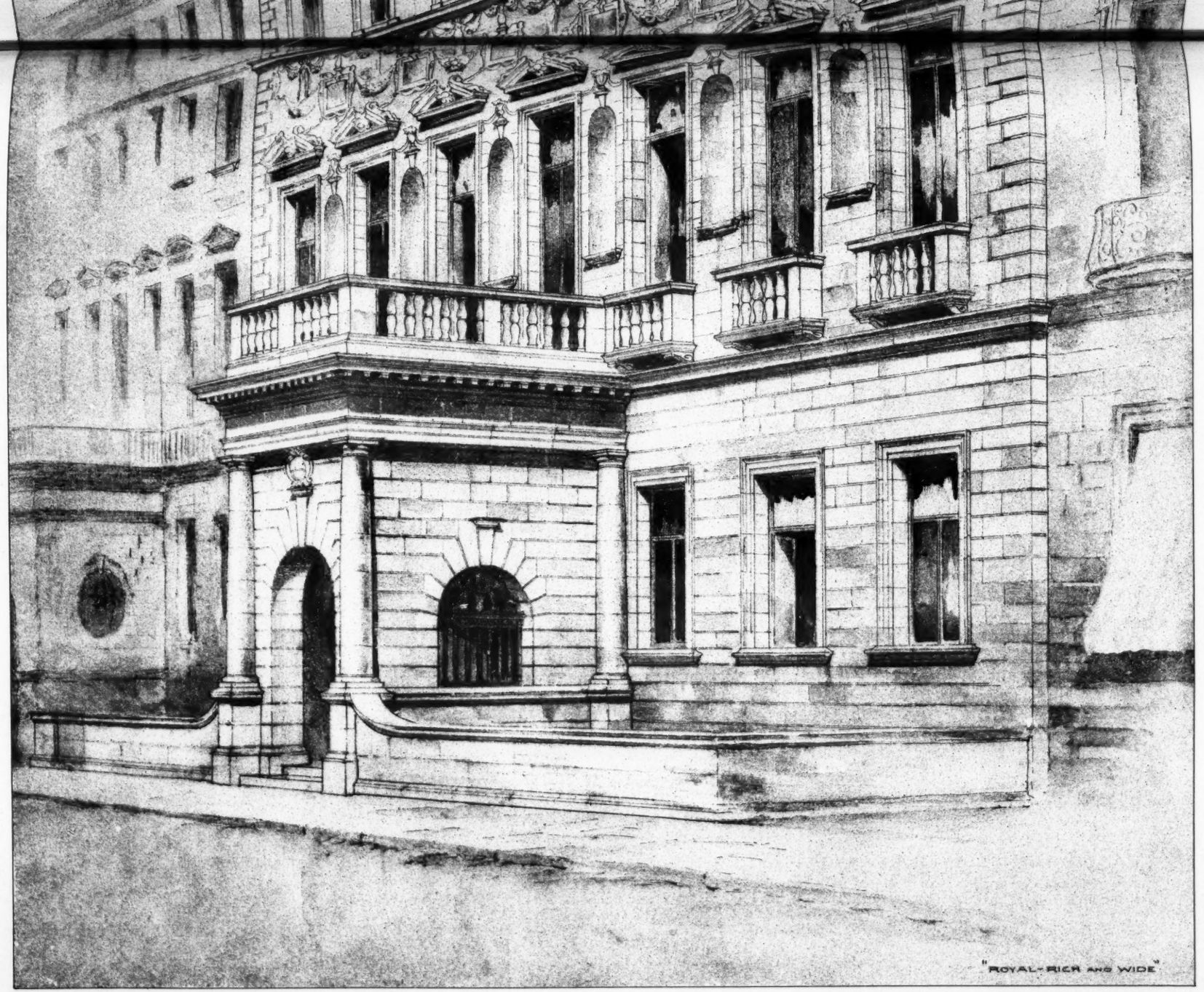
INK-PHOTO SPRAGUE & Co 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

— DESIGN FOR A TOWN HOUSE

— HERBERT BAKER —

— COBHAM · KENT. —





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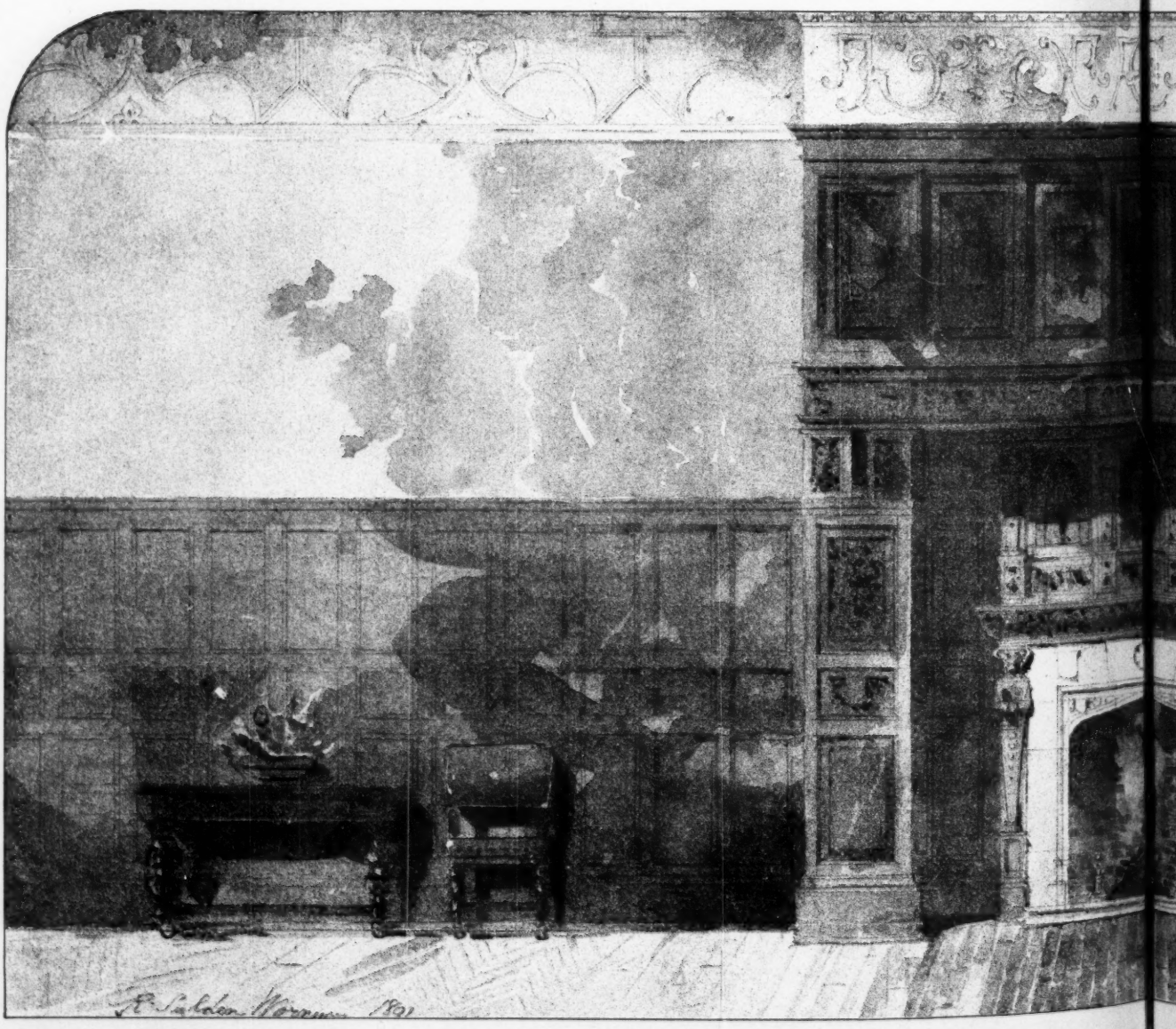
DESIGN FOR A TOWN MANSION.—By Mr. Herbert Baker, A.R.I.B.A.

Royal Academy Exhibition, 1892.

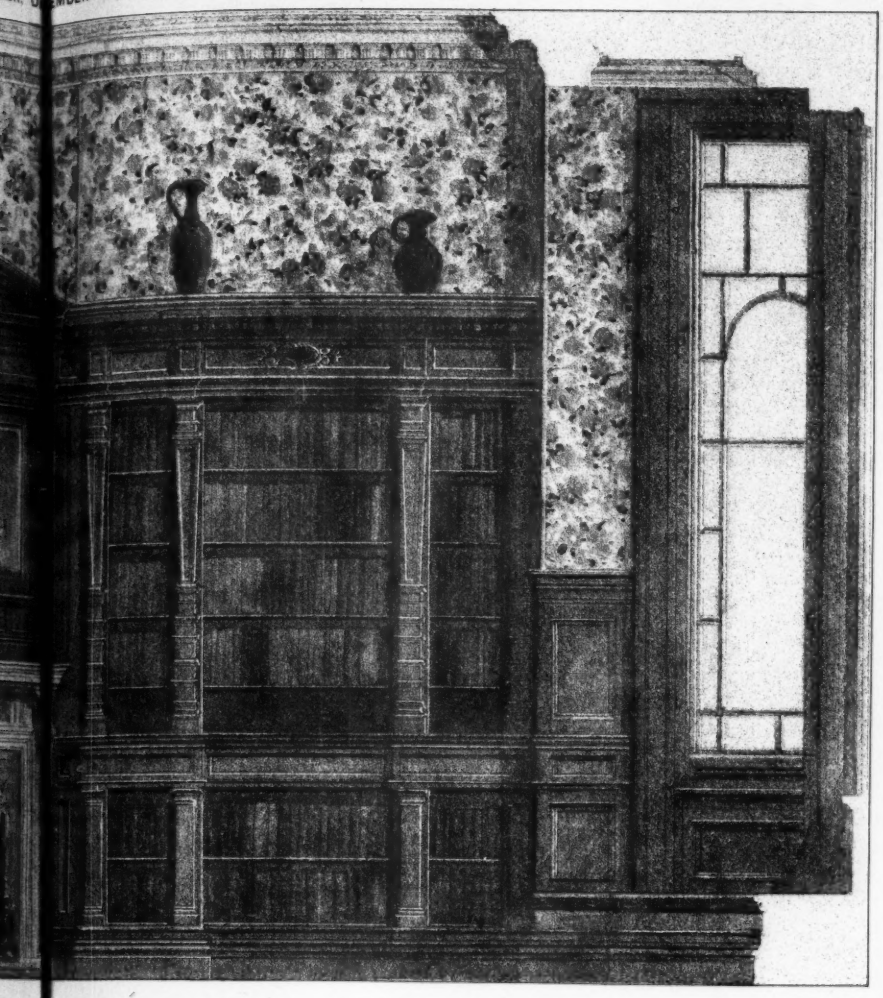
Royal Academy Exhibition, 1892.

INTERIOR OF A LIBRARY IN LONDON.—

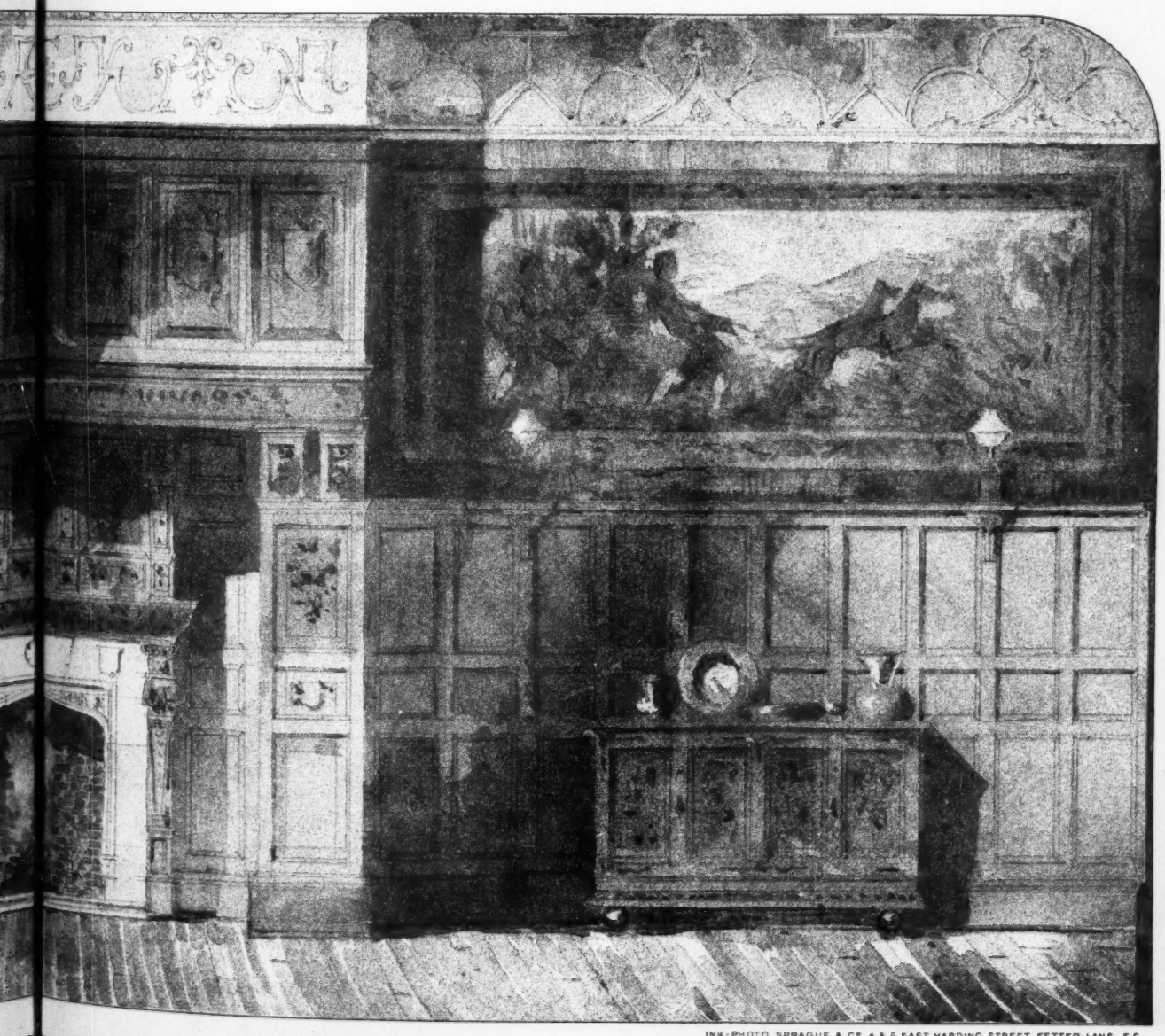


DINING ROOM: HOUSE AT ST. SEBASTIAN, SPAIN.—

Royal Academy Exhibition, 1892.



LONDON.—Mr. G. Aitchison, A.R.A., Architect.



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AN, S.W.—Mr. R. Selden Wornum, F.R.I.B.A., Architect.

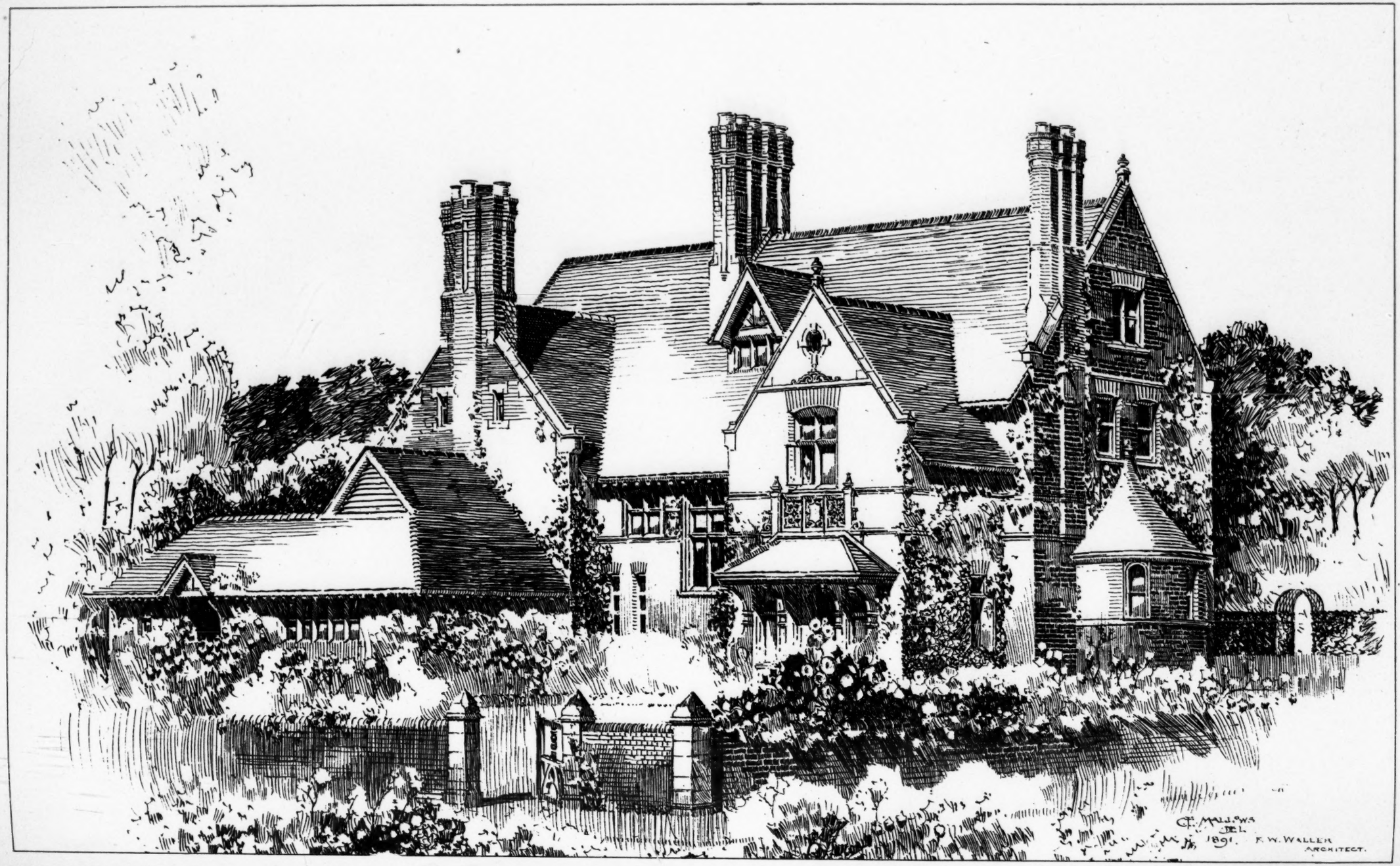

PHOTO-LITHO. SPRAGUE & Co 4 & 5 EASTCHEAP STREET, FETTER LANE, E.C.

HOUSE AT EASTBOURNE.—Mr. F. W. Waller, F.R.I.B.A., Architect.

Royal Academy Exhibition, 1892.

PHOTO-LITHO. SPRAGUE & Co. 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

HOUSE AT ST. SEBASTIAN, SPAIN: LODGE AND GATES.—Mr. R. Selden Wornum, F.R.I.B.A., Architect.

Royal Academy Exhibition, 1892.